NOVEMBER 1961

FOOD ENGINEERING

A CHILTON PUBLICATION

FOR BETTER MANAGEMENT IN MANUFACTURING

The 4th "INGREDIENT"

BUILDS SALES... yet never costs a penny!

Food manufacturers satisfied with only the finest quality ingredients have for decades been using STERWIN (1) color, (2) enrichment and (3) vanillin. The result has been ice cream, baked goods, candy, beverages (and many other food products) that look better, taste better . . . *sell better!*

STERWIN's 4th "ingredient" has played a major role, too, in much of this sales success . . . and never cost a penny! For this "ingredient" is STERWIN Service . . . practical suggestions and recommendations by STERWIN's Technically Trained Representatives that frequently cut production costs while helping turn out better selling food products.

These STERWIN Representatives are highly trained, broadly experienced men who constitute a nationwide, on-the-spot task force for the more efficient production of food products. Small, medium and large food manufacturers have saved time, money, labor as a result of the sound advice and counsel offered by these sales-minded technicians.

If you use color, vanillin, enrichment . . . see your STERWIN Representative or write us direct. Learn how the 4 STERWIN ingredients can help your products look better, taste better . . . *SELL better.*

Sterwin Chemicals INC.

Subsidiary of Sterling Drug Inc.

1450 Broadway, New York 18, N.Y.

CIRCLE 2 ON INQUIRY CARD

FOOD ENGINEERING
FOR BETTER MANAGEMENT IN MANUFACTURING

VOL. 33 NO. 11

November, 1961

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Process readily removes water from beer, wine, fruit juices, milk.

SPECIAL FE REPORT

Flexible films offer food maker wide variety of choice as to costs, protection requirements, and merchandising appeal.—p. 69.

Dorr-Oliver advanced design filtration equipment gives A.E. Staley Mfg. Co.

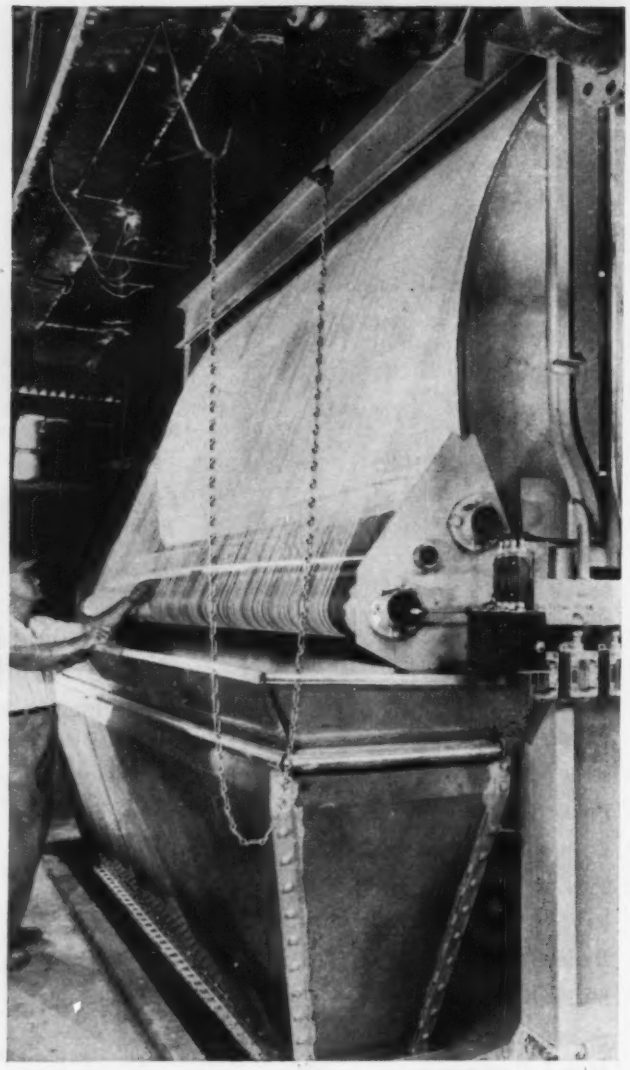
HIGH CAPACITY STARCH PROCESSING

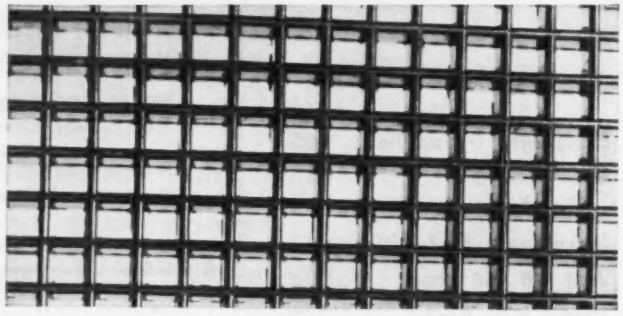
Modernization of starch processing at A. E. Staley Mfg. Co., Decatur, Ill., includes high capacity dewatering prior to drying provided by two Oliver String Discharge Type Filters.

These stainless steel filters are typical examples of the flexibility offered by Dorr-Oliver equipment in meeting specific job requirements. Special features include the new D-O molded rubber sectional waffle-type drainage deck. This design provides the greatest amount of open drainage area available in any type of grid, resulting in high filtering capacity and exceptionally low filter cake moistures. The smooth, rounded rib surfaces offer excellent support for the filter media, increases cover life and provides for easier cleaning without removing grids. The special rubber composition eliminates the problem of corrosion at a most vulnerable point.

For more information on the complete line of D-O equipment for the starch industry, write Dorr-Oliver Incorporated, Stamford, Connecticut.

BELOW: One of the two Oliver String Discharge Filters used for starch dewatering at A. E. Staley Mfg. Co.





ABOVE: New waffle-type rubber drainage grid installed on the above filters. Approximately ½" square openings provide exceptionally large drainage areas. A sample of this grid will be sent on request.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

FOOD Engineering

Chestnut & 56th Sts.
Philadelphia 39, Pa.

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FOOD ENGINEERING (Formerly Food Industries) November, 1961, Vol. 33, No. 11.

Published monthly by Chilton Company: Executive, Editorial, Circulation and Advertising Offices, Chestnut & 56th Sts., Phila. 39, Pa. Second Class postage paid at Philadelphia Pa. Title registered in U. S. Patent Office.

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Is it fish or fowl... or even fancy fruit?

Here, at last, is **a family of sparkling plastic containers** which will propel your product off the counter or out of the freezer or refrigerator right into Milady's shopping cart!

J-E's food containers were designed for **you.** They can be filled at plus-boiling temperatures and immediately quick frozen without distortion or clouding. Available in rounds and rectangles—from 5 ounce to 16 ounce capacity—J-E containers are fitted with snap-in, snap-on or snap-over lids which require no adhesives or tapes . . . or they can be heat sealed. And J-E hasn't forgotten the store level problems, either . . . lids and pre-cut sheets for heat sealing are recessed to prevent slipping and sliding, even when frozen.

Put more sparkle in your sales with an economical food container of FDA-approved oriented styrene!

J-E PLASTICS MANUFACTURING CORP.
400 Nepperhan Avenue, Yonkers, New York • Phone: GR 6-3456

Clip and return this coupon . . .

We'll see that you receive complete technical data **plus** an appropriate sample of a sales-minded J-E container.

NAME_____
ADDRESS_____
COMPANY_____
OUR PRODUCT IS_____
PLEASE SEND ME TECHNICAL DATA_____
F-E 9-61

HOW FMC CAN HELP YOU

FREEZE-DRY

FOR GREATER PROFITS

FMC's more than 70 years' experience in technological research and the design and manufacture of food preparation and processing equipment has been applied to the successful development of complete freeze-drying systems, now available for your production lines.

THE FMC FREEZE-DRYING SYSTEM ASSURES YOU OF:

Internal Condensing: Condensor plates are located inside the vacuum chamber. Moisture transfer is short and direct.

Labor Saving Through Efficient Product Handling: Unique FMC mobile platen car provides:

- ***Large Capacity*** – 500 to 1,000 square feet of drying surface, depending on product.
- ***Inherent Heat Application*** – Hóllow product shelves serve as heating platens.
- ***No Product Thawing*** – Platen car is loaded in a cold room and moved to vacuum chamber immediately.
- ***Ease of Mobility*** – Platen car travels on rail system. Positive control of car and contents assured at all times.
- ***Minimum Product Handling*** – Platen car carries product throughout entire processing cycle. No product transferring.

Complete System: FMC's "package unit" includes all components required for complete plant operation.

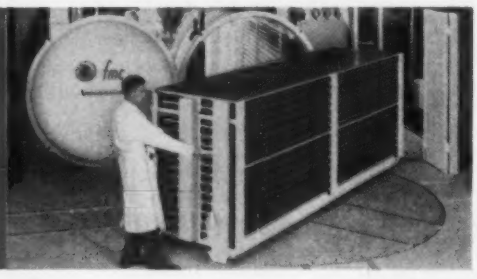
Fast Defrost: Minimum down-time between processes. Combined hot gas and steam purge systems rapidly defrost condensor plates.

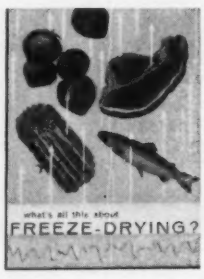
Factory Service: "On the spot" service and consultation available from the manufacturer.

An informative brochure, **"What's All This About Freeze-Drying?"** is yours for the asking.

FMC's thorough experience and technical know-how is available to provide you with practical assistance in the application of an FMC Freeze-Drying System, to meet your particular requirements. Call your FMC representative or write us today.

FMC Freeze-Drying Systems are designed for cost-saving product handling as shown here by unique platen car on turntable, ready to enter vacuum chamber. FMC Freeze-Drying Systems are flexible, can be expanded by adding vacuum chambers to meet your growing requirements, without adding to common vacuum, refrigeration and heat systems.





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TRENDS & FORECASTS

Freeze-drying will be $2 billion, or 4 billion lb., business annually by '70, investment advisory service predicts. Investment of $100 million in freeze-drying equipment would be required to produce that much, Stokes estimates.

Freeze-dried chicken and shrimp have been introduced into Army supply system. Late in '62, or early '63, Army and Air Force plan to use 500,000 lb. of freeze-dried meat, poultry, seafood.

Army's quick-serve meals, if fed to 100,000 men for year, would require 9,120,000 lb. of freeze-dried meat, poultry, seafood; 900,000 lb. of vegetables (corn, peas, spinach); 700,000 lb. of fruits.

Freeze-dried shrimp are shipped to Chicago at cost of $1.65 per 100 lb., or 500 lb. reconstituted. For frozen shrimp, cost would be $24.20. Freeze-dried can be sold 14¢ per lb. cheaper.

Pack of canned green peas in '61 is up 10.3% to 29.9 million cases, NCA reports. Supply is smaller because of less carry-over.

Sweet cherry pack jumped 74% to 1.7 million cases, according to NCA. Pack of canned apricots is down 22% to 5.8 million cases.

Potential catch of fish to supplement world's supply of protein food is about 55 million metric tons, Fisheries Bureau estimates.

Slaughter of cattle and calves in '61 is forecast at 35 million head, slightly more than last year, by AMI. Pork shows no change.

Production of foods overseas by American firms hit $2.9 billion in '60, compared to $2.5 billion in '57, Commerce Dept. reports.

Dehydrated potatoes increased 32% in '60; French fries, 53%; chips and shoestring potatoes, 5%. Total potatoes processed gained 22.5%.

World population increased 1.6% in '60-'61, but food production gained only 1%, FAO reports. Little increase is expected in '62.

Biggest gains in value of food shipments in '59 are: Processed cheese, up 39%; frozen fruits, juices, vegetables and specialties, 38%; canned poultry, 32%; ice cream mix and ice milk mix, 25%; canned specialties, 21%.

Cost of sanitation totals almost 5¢ per cwt. of annual flour production. Investment in instrumentation by millers averages $2.93 per cwt. annually, will be boosted 77% in 5 years.

See Developments to Watch p. 15

What will the foods of the future be like ?

PFIZER PRODUCTS FOR THE FOOD INDUSTRY
MILLING & BAKING
Bi-Cap® (flour enrichment mixtures), L-Lysine, Glucono-Delta-Lactone, Cream of Tartaric Acid, Citric Acid, Sorbistat®, (Sorbic Acid), Sorbistat®-K (Potassium Sorbate), Sodium Benzoate, B Vitamins, Sol-U-Pak®
DESSERT
Citric Acid, Ascorbic Acid, Sodium Citrate, Fumaric Acid, Calcium Cyclamate, Calcium Gluconate, Sorbistat® (Sorbic Acid), Sorbistat®-K (Potassium Sorbate)
CANDY
Citric Acid, Ascorbic Acid, Calcium Cyclamate, Tartaric Acid, Cream of Tartar, Sorbistat® (Sorbic Acid)
FROZEN FOOD
Citric Acid, Ascorbic Acid, A-C-M®
MEAT PACKING
Citric Acid, Ascorbic Acid, Erythorbic Acid (Isoascorbic Acid), Sodium Erythorbate (Sodium Isoascorbate), Sodium Ascorbate, Biostat®-PA (Oxytetracycline), Sodium Citrate
DAIRY
Citric Acid, Sodium Citrate, Vitamin A, Sorbistat®-K (Sorbic Acid), Sorbistat®-K (Potassium Sorbate), Vitamin A Palmitate, Types M & W
OIL & FAT PRODUCTS
Vitamin A & D, Beta Carotene, Citric Acid, Sodium Benzoate
CANNING PRESERVING
Citric Acid, Ascorbic Acid, Sodium Citrate, Calcium Cyclamate, Sodium Benzoate, Tartaric Acid
BEVERAGE
Citric Acid, Ascorbic Acid, Sodium Citrate, Sorbistat®-K (Potassium Sorbate), Calcium Cyclamate, Sodium Benzoate, Tartaric Acid, Caffeine, Erythorbic Acid (Isoascorbic Acid)

Whatever the form or content of tomorrow's foods, they will owe something to the research laboratory of today. If you are working to develop new food products, or to improve present ones, the end to your search may be as close at hand as your Pfizer representative.

The name Pfizer has been synonymous with highest quality ingredients and service for the food industry for more than 110 years. This reputation results, in no small way, from the contributions of Pfizer Technical Service.

Our customers have come to rely on our many products and on our readily available technical service "team" at every stage of product development—from research to finished production.

For example, when manufacturers of "convenience" mixes—general-purpose and specialty baked goods—wanted a more controlled type of leavening action, Pfizer offered Glucono-Delta-Lactone. This chemical leavening acid imparts no unpleasant aftertaste, yet helps provide products having excellent volume and fine even texture. G-D-L's high stability in storage also insures longer shelf life.

Mold and yeast growth had been causing food-freshness problems in cheese, wines, prepared salads, and baked goods. Today, Pfizer Sorbistat®-K and Sorbistat® provide the means to ensure a "stay fresher longer" quality in such products.

In the nutritional area, Pfizer L-LYSINE has made possible great strides in improving the protein quality of grain-based foods ranging from breads to breakfast cereals . . . without affecting the taste or texture of the product. This essential amino acid "activates" the protein potential present, thus improving the total protein quality.

These few examples merely typify Pfizer's experience and willingness to help. Let us prove that our products and personnel can help solve your problems.

If you have a food product problem, look to Pfizer first.

Science for the world's well-being®

Pfizer

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Chas. Pfizer & Co., Inc.
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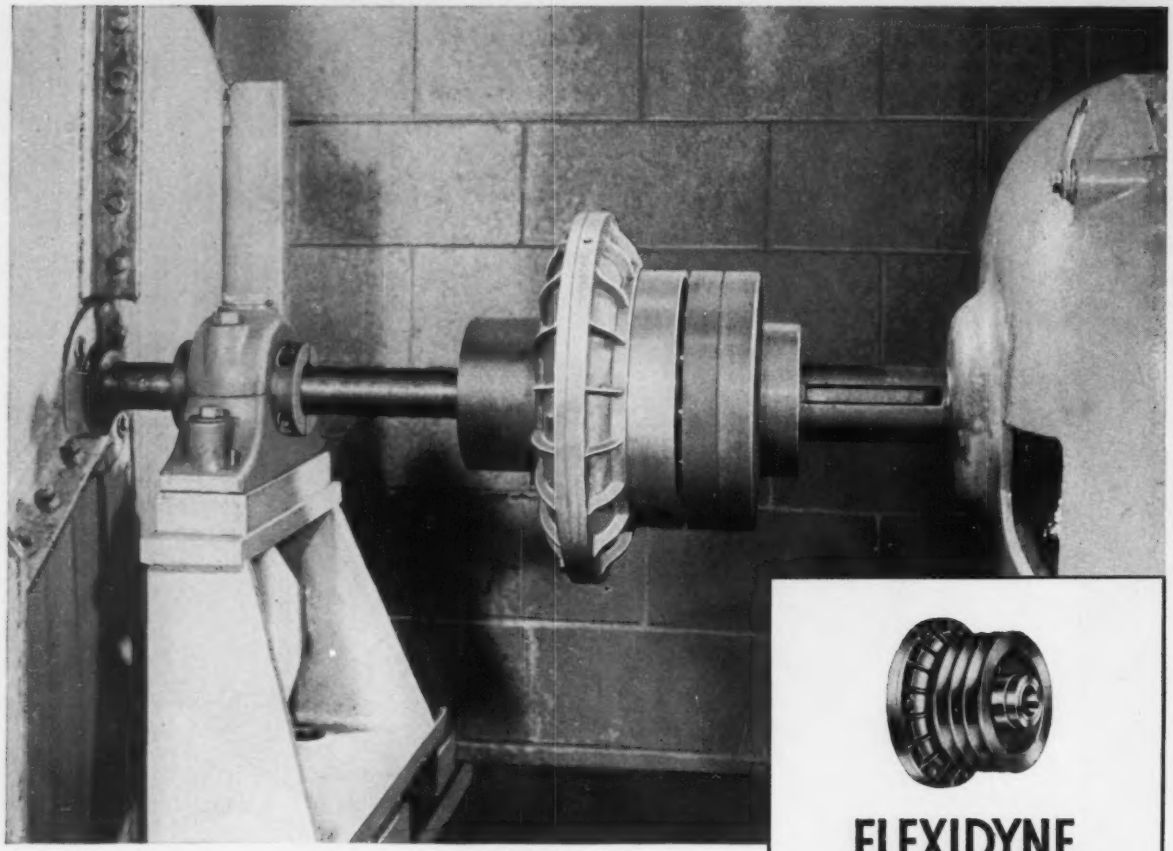


Look, Folks...No Jolts!

— and no reduced voltage starter!

— no oversize motor!

Introduce Flexidyne into your drive system and your stubborn loads take off smoothly, without the necessity of oversize motors or costly controls. Flexidyne provides the equivalent of a "no load" start, reduces maintenance, protects motors against shock or overload, and operates at 100% efficiency at full load speed!

Across the nation — on blowers, shears, mixers, agitators, chippers, ball mills, cranes, conveyors, cotton cards, jaw crushers, *everywhere* — thousands of Flexidynes are performing brilliantly. Here is the *new and better way* to start loads smoothly!

Flexidyne is available from stock in 8 drive sizes and 10 coupling sizes for capacities to 1000 hp. Ask your Dodge Distributor, or write us for complete technical bulletin.

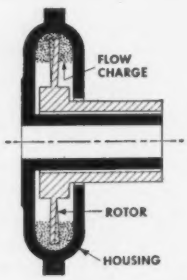
Dodge Manufacturing Corporation, 2800 Union St., Mishawaka, Indiana

FLEXIDYNE

THE DRY FLUID DRIVE

The "fluid" in Flexidyne is heat treated steel shot. A measured amount, called the flow charge, is contained in the housing which is keyed to the motor shaft. When the motor is started centrifugal force throws the flow charge to the perimeter of the housing, packing it between the housing and the rotor which transmits power to the load.

After the starting period of slippage between housing and rotor the two become locked together and achieve full load speed, operating without slip and at *100% efficiency.*



The Products with the Pluses... **DODGE** ***of Mishawaka, Ind.***

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the *white* pages of your phone book. Factory trained by Dodge, he can give you valuable assistance.

Schedule of Events

November

5- 8—Nat'l Frozen Food Merchandising Convention & Exposition, Americana Hotel, Bal Harbour, Miami, Fla.
7- 9—Point-of-Purchase Advertising Institute, show, McCormick Place Exhibition Center, Chicago.
7-10—Packaging Machinery Mfrs. Institute, Show, Cobo Hall, Detroit.
13-15—Grocery Mfrs. of America Inc., 53rd Annual Meeting, Waldorf-Astoria Hotel, NYC.
13-16—American Bottlers of Carbonated Beverages, Internat'l Soft Drink Exposition, Brook Exhibition Hall, San Francisco.
27-D1—Exposition of Chemical Industries, New York Coliseum, NYC.

December

5- 7—Institutional Food Mfrs. Assn., 9th Annual Meeting, Edgewater Beach Hotel, Chicago.
5- 7—Nat'l Dried Bean Council, 5th Annual Research Conference, Brown Palace Hotel, Denver.

January

19-20—Nat'l Preservers Assn., meeting, Galt Ocean Mile Hotel, Ft. Lauderdale, Fla.
22—Nat'l Canners Assn., annual meeting and '62 Canners' Convention, Americana Hotel, Bal Harbour, Fla.
22-25—Nat'l Plant Engineering & Maintenance Show, Convention Hall, Philadelphia.

HORS D'OEUVRES

▸ Freeze-dried foods can be rehydrated with any liquid — including wine, beer, and rum. Think of the exotic possibilities . . . and reach for the bicarb!

▸ If parents are not harassed by their children, they will spend 10 to 15 minutes longer in the supermarket each trip. Bet they'll make more trips, too. So who wants the child-checking concession?

▸ Newest development in the canned water boom comes from Scotland. It is Scotch water, to be shipped to America as a mixer for Scotch whiskey. The Scotch certainly aren't very tight with our money.

▸ Two out of three homemakers have served instant potatoes. But only one in five serves them frequently. Apparently convenience alone is not enough.

▸ When you pour wine, twist the bottle slightly to catch the last drop and keep the tablecloth clean. Wine is good to the last drop that doesn't drip.

▸ No. 2 tomato cans will be painted yellow and attached to Philadelphia's litter baskets as sidewalk ashtrays. Cost is 2 cents each. Cheap, and no butts about.

▸ A prominent safety engineer has a suggestion about lift trucks. To curtail excessive damage done by them to plant walls and equipment, round off the corners of the drivers' square heads.

The big PLUS SERVICE EXPERIENCE RESEARCH PERFORMANCE in Oakite

How an Oakite Coordinated Sanitation Program can reduce sanitation costs for you

An Oakite Coordinated Sanitation survey of your plant gives the same effect as adding a sanitation expert to your maintenance staff —except in one respect. It doesn't cost a cent. It *does* do this:

1. *It seeks out ways to cut your total plant sanitation costs.*
2. *It keeps your equipment at top operating efficiency . . . prolongs its productive life.*

A Coordinated Sanitation survey is simply an experienced and expert over-all view of everything involved in plant sanitation. It shows you economies on materials . . . reduces the number of types you need . . . points out where it will pay you to *mechanize* cleaning . . . details the savings in cleaning crew time and toil. And it's programmed to provide maintenance cleaning *before* trouble occurs.

In his survey of your plant the Oakite man would cover such jobs as produce washing, conveyor chain lubrication, use of mechanized cleaning equipment, brightening stainless steel equipment, cleaning of pasteurizers, evaporators, stills, cookers, filling equipment, etc., end-of-season clean up, odor control, truck washing, floor washing.

The big PLUS in Oakite

Just one of the plus factors you get with Oakite materials, the Coordinated Sanitation survey combines the experience of the entire Oakite organization, and the latest cleaning research. It's accomplished by a man who really knows his business—and a lot about yours, too. To learn more about it, call your local Oakite man today, or write for Bulletin. Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

OAKITE®
over 50 Est. 1909 SCIENCE
years' leadership in industrial cleaning

Technical Service Representatives in Principal Cities
Export Division Cable Address: Oakite

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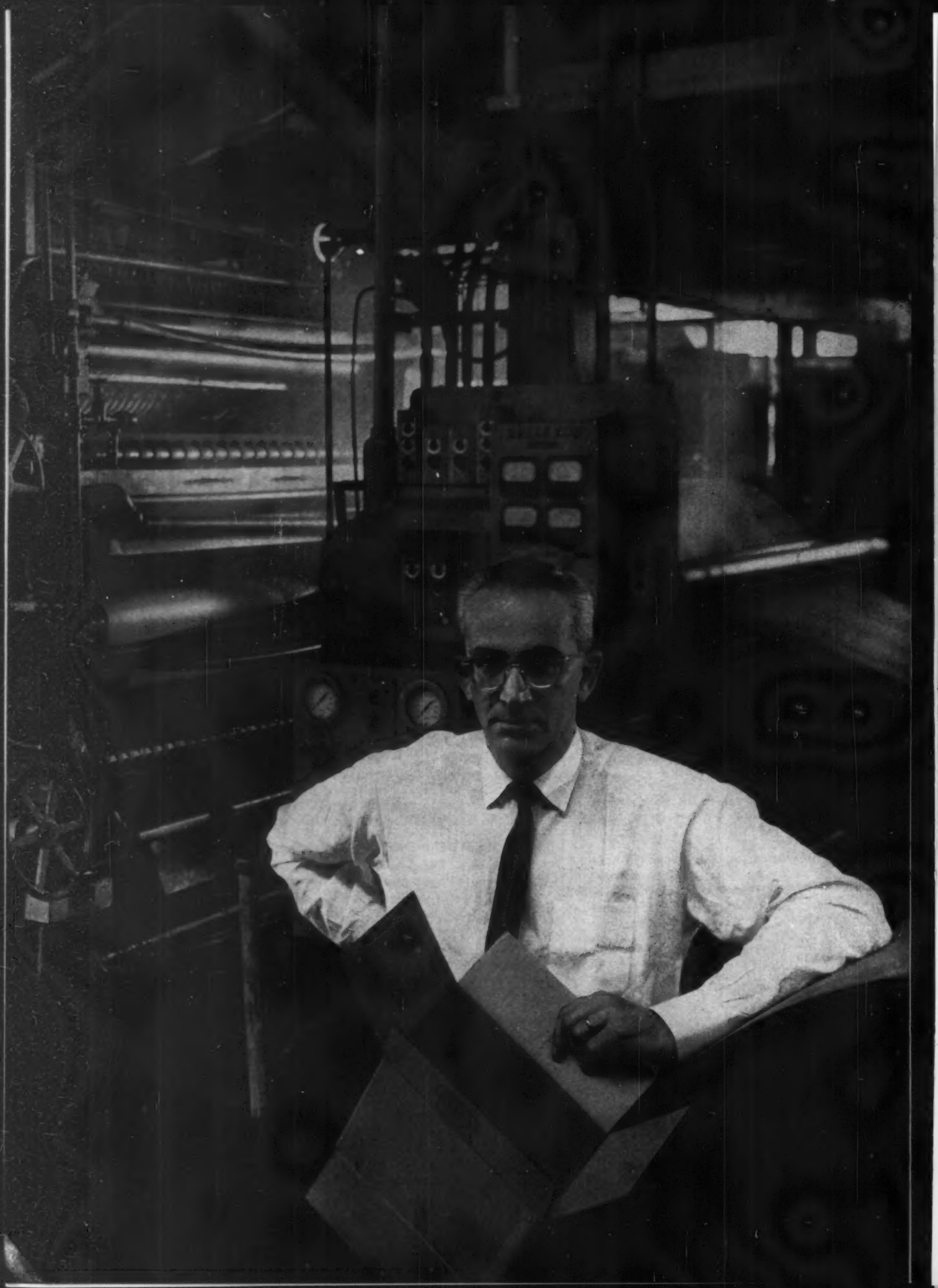

With him, every case is special

Over a thousand companies have put the construction of their corrugated boxes in Metin Hamarat's hands.

METIN HAMARAT is manager of all Union-Camp corrugated box plants. The shipping containers these plants produce are used by virtually *every* manufacturing industry in the country.

There's a good reason for this wide acceptance. Metin, you see, is a perfectionist. Although making corrugated boxes is a mass production business, he refuses to compromise with quality.

Why this passion for precision when most corrugated boxes look alike? The answer lies in the myriad of unapparent features that contribute to the performance or quality in a corrugated box.

For instance, consider the combining of the sheet itself—the corrugated "sandwich". Even the *quantity* of adhesive used in this operation is critical. Skimp, even slightly, and the sheet might peel apart later. Use too much adhesive and you often get an unsightly washboard effect that can spoil the appearance of your printing. And, as you might expect, Metin and his pressmen take particular pride in corrugated box printing. So much so, that they frequently *sign* their work!

Scoring is critical, too. Just being *straight* isn't enough. Too deep a score, as Metin points out, weakens the board and makes it prone to tear. Too narrow, or shallow, will make the box hard to fold—cause foul-ups on the packaging production line. And, of course, costly downtime.

And, there's *slotting*—the knife-cuts that form the top and bottom box flaps. Metin is meticulous here, as well. If you've ever tried to close and seal a carton whose flaps didn't meet perfectly or exactly parallel to each other, you'll understand why.

Attention to these and other key steps in the manufacture of Union-Camp corrugated boxes are the reasons they pay off in performance on your packaging line. That's why with Metin Hamarat, every case is special.

His craftsmanship manifests itself in the quality of products produced in *all* Union-Camp box plants. It typifies the thoroughness of Union-Camp's packaging service. This service covers corrugated box development and design. It includes specifications control, art and merchandising counsel and plant surveys of your materials handling operation.

We'll be glad to tell you more about this comprehensive corrugated service and what it could mean to you in packaging efficiency. A note on your letterhead will bring a prompt reply. Write us today.

UNION-CAMP®
CORRUGATED BOXES

Union Bag-Camp Paper Corporation • 233 Broadway, N. Y. 7, N. Y.

Plants:

*Dedham, Mass.; Allied Container Corp., Route 128, Allied Drive
Trenton, New Jersey; 1400 E. State St.
†Washington, Penna.; P. O. Box 285
†Cleveland, Ohio; 10200 Miles Ave.
†Sharonville, Ohio; P. O. Box 86
Chicago, Ill.; 4545 West Palmer
†Benton Harbor, Mich.; 11th St. & Britain Ave.
†Monroe, Mich.; 1109 East Elm Ave.
†Eaton Rapids, Mich.; P. O. Box 8
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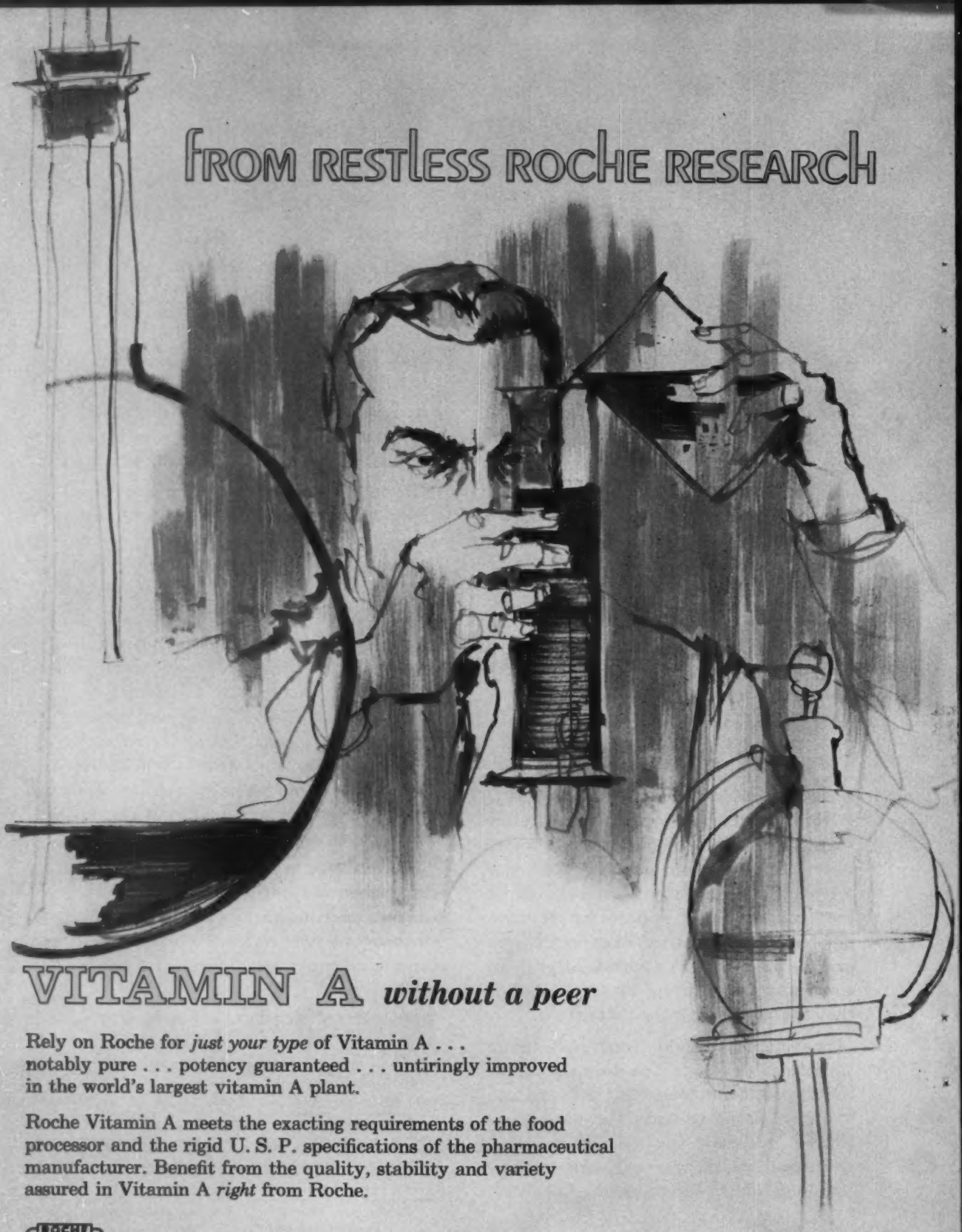
Lakeland, Florida; P. O. Box 454

*Subsidiary Companies †River Raisin Division



VITAMIN A *without a peer*

Rely on Roche for *just your type* of Vitamin A . . . notably pure . . . potency guaranteed . . . untiringly improved in the world's largest vitamin A plant.

Roche Vitamin A meets the exacting requirements of the food processor and the rigid U. S. P. specifications of the pharmaceutical manufacturer. Benefit from the quality, stability and variety assured in Vitamin A *right* from Roche.

ROCHE

Fine Chemicals Division • **HOFFMANN-LA ROCHE INC** • Nutley 10, New Jersey
In Canada: Hoffmann-La Roche Limited, St. Laurent, Montreal 9, P.Q.

ROCHE®

DEVELOPMENTS TO WATCH

Freeze-drying cost may be cut to 2½-3½¢ per lb. of water removed by high-temperature, short-time cycle developed by Stokes. Initial drying temperature would be 300F. or more. Product would stay below 140F.

Paul A. Mariani Co. has leased freeze-drying plant built by FMC.

"Extractive drying" is new USDA technique for removing residual moisture from dehydrated foods. Hydrophilic solvent is added to extent of 10% of weight of product. Ethanol has been used.

Adding fish protein supplement to vegetable diet of cattle increases rate of growth, according to report at Conference on Fish in Nutrition. Fish is rated good human food because of its amino acids, minerals, trace elements, and unsaturated fatty acids.

Edible gels and foams made from soybean protein by USDA researchers are considered potentially useful as food items and can improve nutrition in countries where meat is in short supply.

Continuous bread dough mixer developed in England may be adapted to American style breads by Baker-Perkins.

Two wrapped loaves of bread are fastened together by gluing labels to ends at rate of 120 loaves a min. with new National unit.

Bread packaged in transparent plastic film bags closed by twisting and clamping is latest trend. Consumers like reclosability.

Reynolds Metals will make finished aluminum cans for direct sale to packers of frozen citrus concentrates. Three can-assembly lines with combined capacity of 3,000,000 cans will be operating during next Florida season.

Pure fortified Florida grape fruit wine is being introduced.

Suitable for freezing, new Fairview mid-season red raspberry yields 10 to 30% more, retains bright red color, USDA reports.

Eight bushels more per acre are produced by new Roanoke stiff-strawed winter oat developed by USDA. It is resistant to oat diseases prevalent in Southeast.

See Who's Building What p. 17

Washington Report p. 21

Mayfair Markets newest store unit, Anaheim, California

"STYROFOAM®—

installed by a Dow Approved Insulation Contractor—pays big dividends!"

"Since we were introduced to Styrofoam insulation a number of years ago, it has become our policy to use only this material for the insulation of our coolers and freezers," says Bob Bernstein, Director of Store Planning for the Mayfair Markets.

"We've found that the letter-perfect installation of Styrofoam by a Dow Approved Insulation Contractor pays dividends in performance over the years.

"Our current plans call for a continued growth of new markets in selected areas of the Western states. In our rapid growth of expansion, we cannot afford mistakes and must depend upon reliability of products used with minimum of maintenance cost.

"Our selection of Styrofoam and the Approved Insulation Contractor Program is our insurance against future costs, which pays dividends in performance over the years."

Low-cost Styrofoam rigid insulation board contains millions of tiny non-interconnecting air cells. This cellular structure gives Styrofoam a permanent low "K" factor. Further, Styrofoam won't rot, has no food value to attract insects or vermin, and it's so easy to handle that the time and cost of installation are cut to a minimum.

Mr. Robert D. Bernstein, Director of Store Planning for Mayfair Markets.

The seal above is displayed by all Dow Approved Insulation Contractors. They are selected by Dow for their excellent business reputation and high quality workmanship. They carefully follow Dow recommendations for installing Styrofoam. For the name of Approved Insulation Contractor near you, write THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Dept. 1540KE11.

Styrofoam is a registered trademark of The Dow Chemical Company. It is applied only to the homogeneous expanded polystyrene made according to an exclusive Dow process. Styrofoam brand insulation board is available only from Dow and its authorized representatives.

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

Stops moisture...

STYROFOAM®

for pipe covering insulation

Low-temperature pipe covering made of Styrofoam does an excellent job and requires minimum maintenance. Its unyielding resistance to moisture and its permanent low thermal conductivity prevent condensation and dripping—reduce heat transfer.

Pipe covering made of Styrofoam will not crack or split from thermal shock. Since it does not absorb water, it is not affected by ice build-up around uninsulated valves. It's lightweight and easy to apply. A complete line of pipe and vessel covering made from Styrofoam is available from the following fabricators:

COLUMBIA ASBESTOS CO., Portland, Ore. • ENGINEERED FOAM PLASTICS CORP., Elkhart, Indiana • GLO-BRITE PRODUCTS INC., Chicago, Illinois • KENNEDY INDUSTRIES, Los Angeles, California • KRANSCO MANUFACTURING COMPANY, South San Francisco, California • MMM INCORPORATED, Houston, Texas • ROBINSON INDUSTRIES, Coleman, Michigan • STYRO FABRICATORS, Kansas City, Kansas • STYROFORMICS, INC., Somerville, Mass. • STYROPLASTICS, INCORPORATED, Minneapolis, Minnesota • TUFFLITE PLASTICS, INC., Ballston Spa, New York

DOW

Who's Building What

Monthly Reports: These food firms will spend $29,213,500 for expansion.

Contracts Awarded

Agar Packing Co., Chicago, hog processing/packing plant, $574,000.

A&P Tea Co., Ft. Fairfield, Me., potato processing plant, $1,400,000.

Burke Farmers Dairies Inc., Morgantown, N. C., dairy plant, $220,000.

Carnation Co., Austin, Tex., ice cream plant, $139,000.

Crown Meat & Provision Co., Minneapolis, Minn., warehouse, $300,000.

Dairymen's Assn., Kailua, Hawaii, distributing plant, $300,000.

General Foods Ltd., Montreal, Que., chocolate plant, $1,500,000.

Indian Knob Mushroom Farms Inc., Moundsville, W. Va., mushroom plant, $500,000.

Jones Dairy Farm, Ft. Atkinson, Wis., sausage plant addn., $225,000.

Michigan Bean Co., Henderson, Mich., bean processing plant, $500,000.

National Dairy Products Corp., Miami, Fla., warehouse & office, $325,000.

United Grocers Coop., Little Chute, Wis., warehouse, $500,000.

Proposed Projects

American Maize Products Co., Hammond, Ind., plant expansion, $500,000.

Carling Brewing Co., Ft. Worth, Tex., plant, $10,000,000.

Cott Bottling Co., South Portland, Me., bottling plant, $600,000.

Garst Bros. Dairy Inc., Roanoke, Va., plant addn., $110,000.

H. P. Hood & Sons, Suffield, Conn., ice cream mfg. & distributing plant, $110,000.

Kinnett Dairies Inc., Columbus, Ga., dairy plant, $125,000.

Maryland & Virginia Milk Products Assn., Newport News, Va., processing plant, $1,000,000.

M-G Poultry & Egg Co., Houston, Tex., processing plant, $1,200,000.

Nebraska-Iowa Non-Stock Coop., Norfolk, Neb., milk processing plant, $110,000.

Netherland Co., Syracuse, N. Y., dairy plant addn., $1,000,000.

Procter & Gamble Co., Jackson, Tenn., food plant, $1,000,000.

Sara Lee Kitchens, Chicago, bakery, office, research facilities, $3,000,000.

Seven Up Bottling Co., Omaha, Neb., plant, $600,000.

Shepp's Grocery Co., Houston, Tex., warehouse, $125,500.

Streitmann Biscuit Co., Tampa, Fla., warehouse & district office, $250,000.

Wilson & Co., Oklahoma City, Okla., meat packing plant, $3,000,000.

Other Construction News

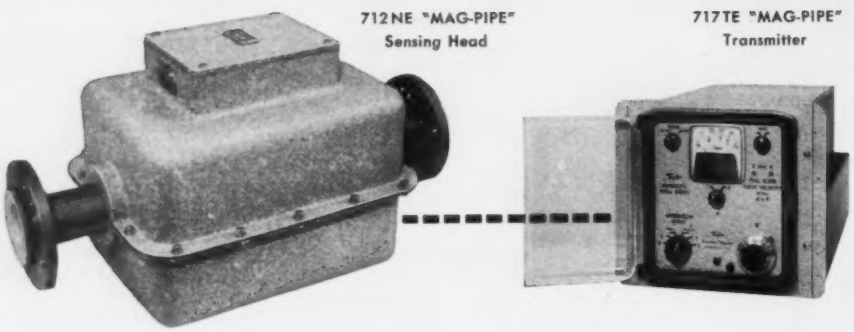
Vita Food Products Inc., specialty fish packers of NYC, plans to streamline present facilities and construct three new plants in Chicago, Philadelphia, and Newark, N. J. A $2,000,000 issue of privately owned debentures has been announced for this purpose.

Chun King Corp. starts construction of its third plant in Cambridge, Md. Plant will serve initially as warehouse and distribution center and will eventually increase firm's production by 50%.

WILSON & CO.'S modern new meat packing plant will replace present facilities in Oklahoma City. At a cost of $3 million, plant will be built on principle of taking raw material, at any given point, and through gradual processes of converting it into finished product, carry it, as a result of those processes, to the point of disposition—the ultimate in modernization.

"MAG-PIPE"*

MAGNETIC FLOW TRANSMITTER



For sanitary flow measurement of Fruit Juices, Soups, Pastes, Purées, Starches, Sugar Solutions, Milk, Beer

Because the sensing element affords completely unobstructed flow—no pockets or crevices to harbor bacteria—the MAG-PIPE Flowmeter ideally meets the sanitary requirements of food industries. Sanitary pipe fittings also perfectly adapt it to Clean-In-Place systems.

Aside from its important sanitary qualifications, the MAG-PIPE Flowmeter is designed to measure the flow of fluids with an electrical conductivity as low as that of distilled water. Presenting no flow restrictions, it is ideal for very low flows, viscous liquids and liquids containing solids.

It transmits signals up to 10,000 feet with ½% accuracy. When used with miniature receiving instruments, such as TRANSCOPE® Recorder-Controllers, it saves expensive panel space and makes centralized control rooms highly practicable.

The MAG-PIPE sensing head is mounted in the flow line. It comprises a flow pipe, an AC magnetic circuit and two electrodes. Sensing head housing is "hose-down proof" (explosion-proofing optional), and is available with sanitary pipe connections or lap joint (Van Stone type) flanges for easy installation—as specified.

The transmitter employs solid state components, being fully transistorized for long-term reliability. It is standard in fixed-range form, in which case calibration is factory set at the desired range. Optionally available with a full-scale vernier adjustment and a 2-position range switch to measure any range span between 0-1 and 0-30 ft./sec. A built-in output meter doubles as circuit checking device.

The MAG-PIPE Flowmeter Transmitter is in production. Consult with us on your difficult flow measurement problems. See your Taylor Field Engineer or write for **Bulletin 98418.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

OUTSTANDING FEATURES

- **High accuracy—1/2% of full scale with most ranges**
- **Full scale velocities as low as 1/2 ft./sec. at only slightly reduced accuracy**
- **Output signal—1-5 ma DC into any load from 0-3000 ohms**

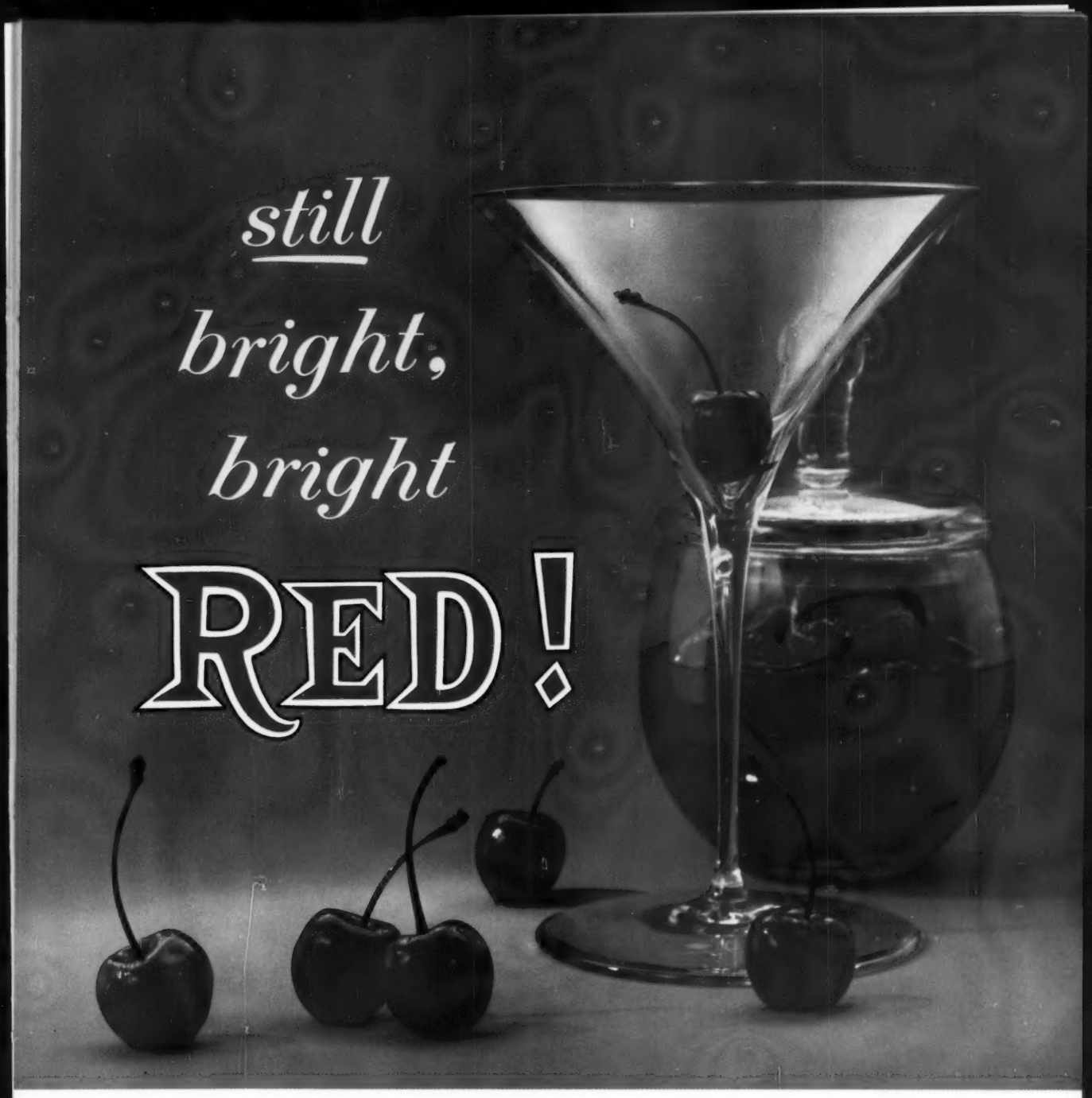
(Electro-Pneumatic Transducer or TRANSCOPE Electronic Control System)

*Trade-Mark

Taylor Instruments **MEAN ACCURACY FIRST**

CIRCLE 18 ON INQUIRY CARD

CIRCLE 19 ON INQUIRY CARD →



Maraschino cherries today blaze with the same full red color that is as traditional to them as black is to licorice or green to spearmint. In a particular way, this symbolizes the remarkable accomplishments that have been made to maintain the appetizing appeal and accustomed colors of foods.

Our technical service staffs have put prodigious and imaginative effort into this research on behalf of the food processing industry. If you have, or have had, any difficulties achieving exactly the desired color in your food products, we invite you to utilize our facilities.

NATIONAL® CERTIFIED FOOD COLORS

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Allied Chemical

ONE OF A SERIES OF CHATS ABOUT THE CONSERVATION AND CONTROL OF HEAT

SARCO TOPICS

WHY THE BIG STRAIN?

It's tough to keep gases and liquids "clean" as they run through a pipe. They drag impurities along, which can make even plain water a trouble maker, let alone more sophisticated juices. That's because water, as a liquid or steam, is intimately involved with vital equipment like steam traps, temperature regulators, or tools. Meters, burners, nozzles, and pumps, too.

By this time you must realize we're going to talk strainers, don't you? A good, stout subject, of interest to all who feel production belongs up and costs belong down. Sarco makes strainers for water and condensate, steam, oil, air, gas and other piped fluids . . . dozens of different sizes and types and ratings of strainers to match every application need. Even our line of plain and simple strainers is built for super service. These are pipeline strainers, types AT, BT, and CT, which are designed for 250, 250 and 600 psi non shock, respectively, and 475°, 450° and 750°F. temperature ratings. Standard screens are heavy-gauge, perforated brass or stainless steel. Sarco specializes in screens that can withstand abnormal pressure differentials created by accumulated sediment.

Next, Sarco's flanged strainers, type D. These come in larger sizes, right up to 12", and are available in standard or extra heavy types.

And finally, *Sarco scraper strainers*, manual or motorized. These are the really eye-popping models, and if you can't use one yourself — well — you'll just have to get your kicks elsewhere.

Examples? Take Inland Steel Company at East Chicago, which gets water from Lake Michigan to cool its large air conditioner condensers. The water used to pass through traveling screens, but still contained fine sand. Clogging! Heat under collars! Frequent cleaning required! Sometimes practically no air conditioning on hot days. (Isn't that always the way?)

The Inland Steel people installed Sarco Rotary Scraper Strainers, Type VRS, which incorporate a hand-operated helical scraper knife within the cylindrical strainer screen. A few turns of the crank at regular intervals, and the sand is scraped off the screen, blown clear, and discharged at pressure through a manual valve to waste. Dismantle the strainer? Shut down the unit? Not *this* strainer!

Now, as long as we've come this far, it's only a hop and a skip to the Firestone Tire and Rubber Co. in Akron, Ohio, who also use water in tremendous quantities. They circulate it through tire presses and a cooling tower, and there's no nonsense about it. It *has* to be clean or damage to equipment could be downright catastrophic. When the plant

modernized and enlarged, Firestone replaced their 4" Sarco hand-operated scraper strainer, type VRS, with a larger Sarco 8" model. And while they were about it, they got the motor-operated type, for continuous cleaning.

When we say that companies like these want the insurance of a Sarco strainer, it sounds like advertisingese, but sometimes there just isn't any other way to put it. Sarco strainers *are* insurance at low cost on the operation of your high cost equipment. So when we ask if you have lumps in your pumps, or worries over your slurries, we're *serious*. We've heard everything in the straining line, so why not write us for literature and answers to those special problems you have.

A T-44 IS THE BEST POLICY

Sorry, but we can't leave the subject of insurance without bringing to your attention one of the best little insurance policies any company requiring cooling control could invest in. It's the *self-powered* Sarco T-44 Automatic Cooling Control. No compressed air or electricity is needed, but its advantages are best described in terms of three different plants of just one Sarco customer — Revere Copper and Brass, Inc.

Revere-Baltimore, Md., has cut water use 40 to 50% with T-44's. But in addition to former water waste, Revere had even more problems: possible wet air from uncontrolled cooling of compressor aftercoolers, plus sweating compressor cylinders; variations in viscosity of hydraulic oil and bearing oil; gas generator water waste; unreliability of manual shut-off of water supply when machines were down.

If your ears perk up in sympathy at mention of any of these problems, the results of Revere's cooling control program should bring you to full attention. One large compressor that had gulped 2400 gallons per hour now takes only 420 gallon sips. In addition all the problems itemized above were solved. T-44's are now used on their air compressors, gas generators, and hydraulic oil systems. At Revere-Riverside, Cal., water savings of 50% were experienced, and at Revere-Rome, N.Y., substantial savings were made too.

But after all, wasting water is only one way of wasting money, so let's go on to another matter of interest: the evils of manual control. When cooling water is controlled by hand the temptation to leave the valve nearly wide open is almost overpowering, in order to play it safe if the load varies. Result: overcooling, of course. And varying the flow runs the risk of undercooling. In either case, lowered process efficiency. Answer: The automatic Sarco T-44, which can't be tempted, is meticulously honest, unsentimental, and plain inhumanly practical when it comes to cooling control. You really ought to write for literature. T-44 is your best policy.

SPARE PARTS INSURANCE

As long as we're near the end, and still on this subject of insurance, may we graciously leave you with this valuable tip? No matter how closely a steam trap approaches perfection, some gremlin may cause it to act up. It's conceivable. So, keep on hand a parts list and spares of key parts for your steam traps and other system components. Parts are small and worth their weight in gold when you need them. A Sarco field engineer will make up a suggested list for you, if you tell us what components make up your system.

Might as well even keep a disc or two on hand for your Sarco Thermo-Dynamic Steam Traps, Type TD-50, even though they're so trouble-free our salesmen keep complaining about the lack of replacement parts business. We'll be glad to tell you about this unique steam trap in case you still don't know how miraculously simple and effective it is.

Pardon our monopolizing the conversation in this series of paid communiques, but we're trying our best to interest you in certain subjects that concern us both — to the point where you'll communicate.

7819

SARCO COMPANY, INC., 635 MADISON AVE., NEW YORK 22, N.Y.

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

SARCO

CIRCLE 147 ON INQUIRY CARD FOR STRAINERS; 148 ON T-44; 20 ON TD-50

Washington Report

Bigger Food Regulation Budget

Real reason why Washington is suing more this year is that food industry regulators have more money and more help. FDA budget jumped over $4 million in '61 while FTC shows over $2-million increase. Justice Dept.'s. Antitrust Div. has a modest budget increase of $801,000 and USDA regulatory and research people have over $2 million in added revenue this year.

Aid to Consumers Stepped Up

Kennedy wooing of the consumer continues to grow. Govt. departments and agencies are under orders to step up their help-to-the-consumer programs.

USDA Secty. Freeman is urging Agricultural Advisory Comm. to break ground in consumer aid programs. HEW Secty. Ribicoff has told 16-member citizens' committee to inform him if consumers need more protection against "impure and unsafe foods."

Trend toward making consumer comfy will probably grow in years immediately. White House is determined to make political hay with voters at expense of manufacturers and processors.

Food Stores Urged in Civil Defense

More and more, USDA is stressing importance of family food reserves in preparation for civilian defense, if and when the bombs should start to drop. USDA's Agricultural Advisory Comm. is urging Secty. Freeman to talk up the need for food reserves in his speeches around the country.

As of now, govt.'s food planning for war is limited. No provision is made yet for getting production, processing, and transport back in operation after bombings.

Storm Continues Over Whole Fish Flour

FDA is standing firm against flour made of whole fish. But the agency is under enormous pressure to abandon its stand.

Whole fish flour interests have lined up a number of Senate and House members who see product as a budding new industry—likely to bring new jobs and new prosperity.

Mail from consumers is running heavy against use of whole fish. Objections are not to use of fish per se, but to waste matter contained in the intestines when whole fish is used.

FDA Commissioner George Larrick is outspoken in his opposition. He claims 50 yrs. of progress in pure food promotion will be lost if whole fish flour is allowed.

USDA Vetoes Packer Dunning

Cost of meat and poultry inspection will continue to be carried by USDA via U. S. Treasury, despite Comptroller General's suggestions that fees be collected from packers.

Number of packing plants has risen sharply in recent years. Job of policing for cleanliness, thus, is a much larger task than a few years ago and USDA isn't anxious for the extra work of fee collection.

Furthermore, poultry raisers are pointing out that they've suffered a bad season and are scarcely in a position to be taking on added costs.

Poultry Marketing Orders Pending

USDA's answer to depressed prices of turkeys and broilers is simple and direct: Marketing orders.

Mid-October meeting of turkey growers in Washington decided that they are finally ready for govt. to impose marketing orders for turkeys and turkey hatching eggs.

And the broiler industry, hard hit by low prices, may be next to ask for USDA aid.

A turkey marketing order, if passed by required two-thirds vote of producers, will be first national marketing order for a food item.

Wider Wet Ham Ban?

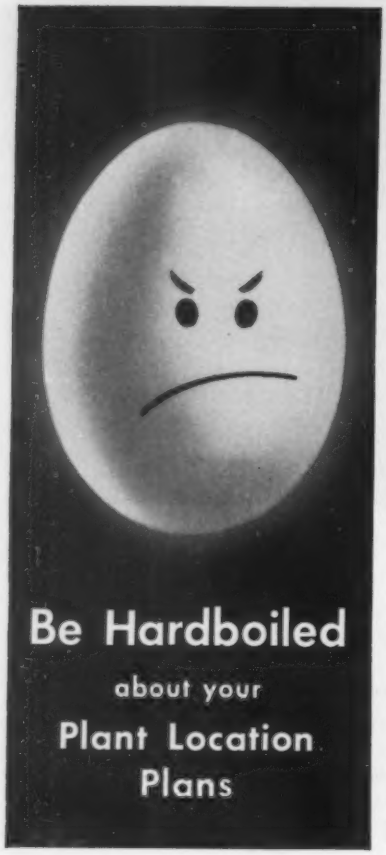
Ban on watered hams moving in interstate commerce goes into effect Nov. 18. USDA's Freeman wants Congress to allow him to stop intrastate shipments as well.

BRIEFS

Record number of seizures in food packaging practices is expected this year. Armed with a record-high budget, FDA now has money and staff to take some long, hard looks at borderline cases that formerly escaped govt. action.

FTC continues to press hard in its drive to get details on promotion monies paid by manufacturers and processors. Armour has successfully defied FTC's demand for data on who got what, but other packers are preparing to answer agency's demand for facts.

FDA must now decide whether or not to continue fighting use of nonsugars. Fed. court in San Francisco held that use of saccharin in "Sta-Trim" candies is legal adulterant. (Turn page)



We like to work with hardboiled plant location people. The harder-boiled the better. That's because we can prove the Toledo-Northwestern Ohio area offers unmatched opportunities for Food Processing Industries. Our proof is contained in a survey of the area by Fantus Research, Inc., one of the nation's foremost industrial location services. For more information, write or call R. E. Johnson, Manager, Industrial Development Department, The Toledo Edison Company, Toledo 1, Ohio

THE TOLEDO EDISON COMPANY
an investor-owned electric light and power company serving Northwestern Ohio

Washington Report

Senate plans to take a fresh look next year at an old complaint—manufacturers competing with their own customers through their company-owned stores. Senator Russel B. Long is backing two bills designed to slow down manufacturers' retail operations.

FDA is again pushing "Delson Thin Mints" case (at what point does protective packaging become deceptive packaging?). Case is regarded as key test by FDA. Fed. district court formerly upheld Delson, saying that manufacturer is entitled to use protective packaging to safeguard his product. FDA contends that package is deceptive in appearance and hopes to overturn court's ruling.

New union drive to sign up food and drink workers starts Dec. 2. Founding convention of new AFL-CIO Food & Beverage Trades Dept. meets in Miami Beach on that date. Who's to be first president? Inside track seems to go to prominent meat cutter member. F&B Dept. expects to sign up between 750,000 and 850,000 members initially. Officials insist they won't puff-up membership by signing up non-food and non-drink workers.

Manufacturers seeking new depreciation allowances from U. S. Treasury Dept. are finding out the so-called "reform" is no giveaway. Determination of depreciable "lives" of equipment, as done for textile machinery, is not going to be haphazard. While Secty. Dillon promises significant reductions in other industries, these industries will have to prove they need shortened "useful lives" for their equipment.

Pulp and paper defoamers for use in the manufacture of paper, paperboard and containers for the packaging, transporting and holding of food have been cleared by FDA. List of 116 approved products have been published with final regulations.

Onion imports must now be regulated whenever domestic shipments are regulated by marketing orders, according to new USDA notice.

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, JULY 2, 1946, AND JUNE 11, 1960 (74 STAT. 208) SHOWING THE OWNERSHIP, MANAGEMENT AND CIRCULATION OF FOOD ENGINEERING, published monthly at Philadelphia, Pennsylvania, for October 1, 1961.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Grahame E. Riddell, Chestnut & 56th Streets, Philadelphia 39, Pa.; Editor, Frank K. Lawler, Chestnut & 56th Sts., Philadelphia 39, Pa.; Managing editor, Alex K. Porianda, Chestnut & 56th Streets, Philadelphia 39, Pa.; Business manager, None.

2. The owner is: Chilton Company, Chestnut & 56th Streets, Philadelphia 39, Pa.

Holders of more than 1 per cent of the capital stock outstanding of Chilton Company: Mary M. Acton, 260 Sycamore Avenue, Merion Station, Pa.; Mrs. Beulah Fahrendorf, Chateau LaFayette, Scarsdale, New York; Charlotte M. Gray, The Buchanan, 160 East 48th Street, New York 17, New York; Dorothy S. Johnson, Bankers Trust Co., 5th Ave. & 44th Street, New York, N. Y.; Kimberton Hills Farms, Inc., 1608 Walnut Street, Philadelphia, Pa.; Mabel P. Myrin, 1608 Walnut Street, Philadelphia, Pa.; Mary M. Acton, Surviving Trustee U/W/O Clarence A. Musselman, Dec'd, c/o R. F. Irwin, Jr., 2318 Packard Bldg., Philadelphia, Pa., Beneficiaries, Mary M. Acton and David Acton; J. Howard Pew, 1608 Walnut Street, Philadelphia, Pa.; J. N. Pew, Jr., 1608 Walnut Street, Philadelphia, Pa.; Mary Ethel Pew, 1608 Walnut Street, Philadelphia, Pa.; Alberta C. Sly, 415 East 52nd Street, New York 22, N. Y.; Alberta C. Sly, Executrix U/W/O Frederick S. Sly, Dec'd, 415 East 52nd Street, New York, New York, Beneficiaries, Albert C. Sly, Alberta C. Sly, and John E. Sly; Soleil Farms, Inc., 1608 Walnut Street, Philadelphia, Pa.; Steere & Company, c/o Girard Trust Corn Exchange Bank, Philadelphia 2, Pa.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 25,043.

GRAHAME E. RIDDELL, Publisher

Sworn to and subscribed before me this 26th day of September, 1961.

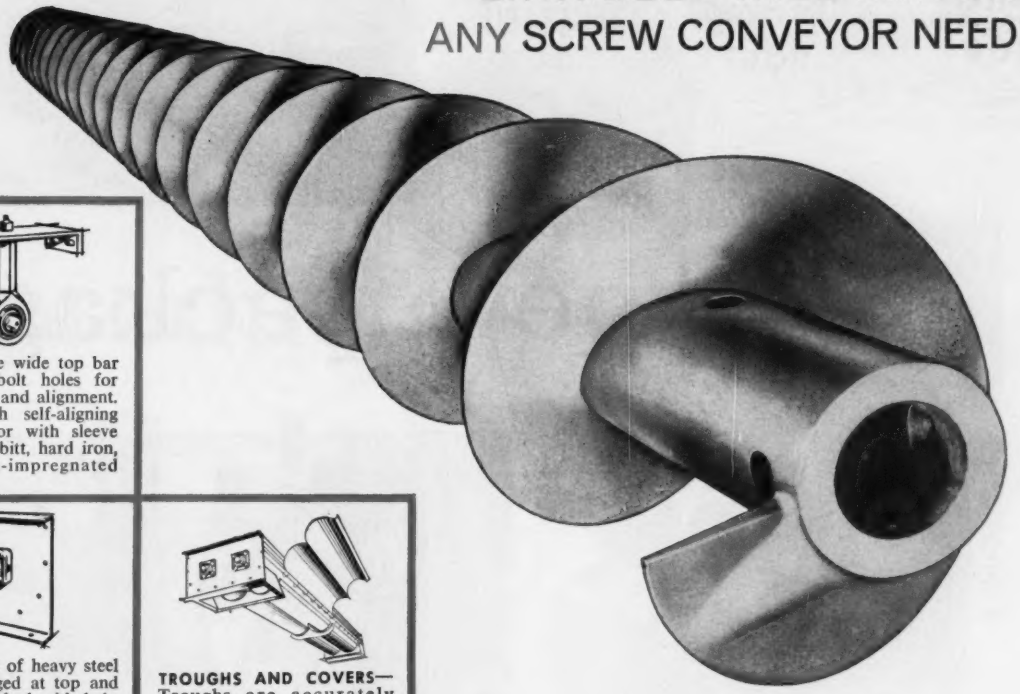
PHILIP J. SHIRE, JR.

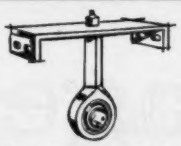
(My commission expires January 7, 1963)

[Seal]

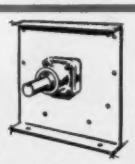
YOU CALL THE TURN

LINK-BELT WILL MATCH ANY SCREW CONVEYOR NEED





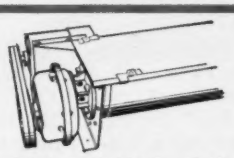
HANGERS have wide top bar with slotted bolt holes for easy assembly and alignment. Available with self-aligning ball bearing or with sleeve bearing in babbitt, hard iron, bronze or oil-impregnated wood.



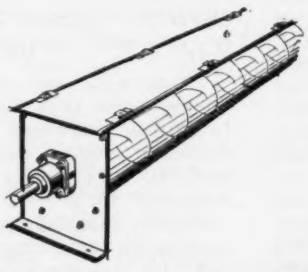
TROUGH ENDS of heavy steel plate are flanged at top and bottom. Furnished with babbitted, bronze or single or double ball bearing flange block with or without trough end seal. Blocks are interchangeable.

TROUGHS AND COVERS—Troughs are accurately formed and jig-assembled. Drop-bottom type facilitates cleaning. Covers can be *semi-flanged*, spring clamped type to facilitate removal.

QUIK-LINK CONVEYOR SCREW. For ease in removal of conveyor section without disturbing other components. Can be furnished on helicoid and sectional flight conveyors.



DRIVES—Link-Belt shaft-mounted speed reducers are simple, compact, rugged — designed for easy mounting on trough end plate. Moto-gears and gearmotors with roller chain drives can also be furnished.



TYPICAL LINE OF SCREW CONVEYOR—All components required to make up a complete screw conveyor are available from Link-Belt. One call, one order, one shipment for all your needs. And, you have the benefits of one-source responsibility.

SINGLE COMPONENT OR COMPLETE SYSTEM—STANDARD OR SPECIAL REQUIREMENTS! Yes, *you call the turn* . . . and you can count on Link-Belt to come up with the *right* answer.

Link-Belt offers conveyor screws in any suitable metal to meet temperature, corrosion, sanitation, abrasion and other requirements. Numerous *standard* types are available from stock in black and stainless steel. And if these can't solve your problem, our engineers will design an economical answer. We have furnished conveyor screws ranging from 1½ inches to over eight feet in diameter . . . with trough clearances as close as 1/32". What are your needs?.

Link-Belt offers an equally broad selection of all other components. All are built to rigid quality standards, made to fit together accurately to assure easy assembly . . . smooth, long-life operation.

You'll find Link-Belt screw conveyor components conveniently available from stock in your area. And expert engineering assistance may be obtained through any Link-Belt office. For details, contact your nearest Link-Belt office or authorized stock-carrying distributor. Ask for Book 2989.

LINK-BELT

SCREW CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Warehouses in All Major Industrial Areas and District Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World. 15,742

FOR FOOD SERVICE ONLY . .

. . . INSULATED VENDING LABELS

new packages

FOIL-LINED PRETZEL CARTONS

LOW CALORIE BREW

NEW PACKAGE, PRODUCTS DEBUTED BY CAMPBELL

Exclusive soups for food service and heat-insulated labels for vending machine products are announced by Campbell Soup Co.

Institutionally, Campbell has created "Insti-Pack," formulated exclusively for the food service industry. Previously, firm's institutional products were extensions of its retail line. First three soups, distinctive from the standard home line, are Chicken Noodle, Clam Chowder, and Vegetable.

Designed to protect the consumer's fingers special labels are used for new products in the Campbell vending line. New items are Chili-Beef Soup, Chicken Stew, Barbecue Beans, and Beef Stew.

MARKET QUANTITY PRETZELS IN FOIL-LINED BOXES

Successful completion of market tests on a new concept in large-quantity packaging for pretzels is announced by Quinlan Pretzel Co.

Quinlan is introducing Alcoa aluminum-lined "caddies" to replace old-style tinplate cans. Unlike cans, new cartons are not reused. Package eliminates customer deposit and also the expensive cleaning and handling involved.

Developed and produced by Stone Container Corp., cartons provide carefully-tested protection for pretzel freshness and are easily reclosed to maintain product quality for extended periods. (312)

LOW CALORIE BEER HITS EASTERN MARKETS

A new low calorie beer has been developed by the Trommer Brewing Co. and is now being marketed in a five-state area comprising New York, New Jersey, Connecticut, Pennsylvania, and Delaware.

New beer, under the Red Letter label, is said to contain one-third fewer calories, less than 100 calories per 12-oz. can or bottle. This content is compared to the 150 to 170 calories in the average beer now on the market.

Packaged in slim and handsome red cans or disposable bottles, Red Letter will be available in a handy six-pack container at prices slightly higher than standard beers.

DISPENSER CLOSURES HAVE DOUBLE SEAL PROTECTION

Three new plastic closures with double seals have been designed to provide improved sealing for dispenser bottles. Each may be modified with a snap bead engagement to provide high speed assembly, insured cap fit, and to discouarge tampering or refilling.

A jet dispenser closure features large marking area, dripless nozzle, insured sealing, and high-speed production design. A squirt dispenser closure has a special "break-off" spout that eliminates

JET (1), SQUIRT (2), CAPTIVE (3), CLOSURES

& products

BORDEN'S INSTANT LITEMILK

KROGER COFFEE PREMIUM

MULTI-LID CONTAINER

scissor snipping and a resealable nozzle. A "captive connected" spout jet dispenser features: Captive spout that moves out of the way by itself; molded spout for leakage-free shipping; and a spout tip opening that may be varied in size and direction.

Plastic is Alathon 20 polyethylene resin. Closure manufacturer is Stull Engraving Co., Garfield, N. J. (313)

MULTI-LID CONTAINER FOR MOIST PRODUCTS

A heavy-duty, squat quart container, suitable for packaging dairy products, meats, salads, and other moist foods, is being shown by Dixie Cup Div. of American Can Co.

New container can be used with four different types of lids—metal coverall, paper coverall, stitched tab paper, or a regular paper disc. Available in the stock "Starflite" design, it can also be specially printed for chains or specific brands.

Cup package is ideal for in-store or central packaging of moist foods. It can be filled and capped by machine or hand and holds two pounds. Attractive design lends package to home table use. (311)

BORDEN MARKET-TESTS LOW FAT DRY MILK

An entirely new kind of instant milk product, a low fat dry milk called Instant Litemilk, is now in initial test markets. Borden product contains 1.35% butterfat when reconstituted. It has about 25% fewer calories yet provides the same Vitamin A and Vitamin D nutrients as fresh whole milk.

Packaged in amber glass jars to protect against harmful light rays, Litemilk mixes instantly and easily into a milk that has the flavor and body associated with fresh milk. Each jar makes four quarts when reconstituted, at a cost of about 17¢/qt.

ATTRACTIVE PREMIUM JAR SPARKS KROGER COFFEE SALES

Effective merchandising is a particular necessity in the competitive instant coffee field—but it pays off. Witness Kroger Co., which scored a clean beat as the first coffee packer to pack instant coffee on a production basis in a special heat-resistant re-usable carafe.

Nine ounces of Kroger's Instant Spotlight Coffee were packed in the specially designed 40-oz. carafe. Premium has a star pattern decoration, a snug-fitting handle, and a plastic closure with a white, imprinted Cel-O-Seal band applied after filling. Carafes

ELECTRIC INFRARED PROCESSING EQUIPMENT NOW PROVIDES TEMPERATURES FROM 1° TO 3000° F. FOR ANY INDUSTRIAL APPLICATION WHERE HEAT IS REQUIRED

The Fostoria Infrared process is partly responsible for the quality built into the products you see here. Its versatility provides economies unheard of in convection heating equipment. Its speed breaks bottlenecks in production techniques. Its flexibility allows adjustment to new conditions with a minimum of effort. If you use heat in your manufacturing process, make a note to check with Fostoria about how to improve product quality with this time-saving, money-saving, labor-saving elecric infrared equipment.

For temperature requirements under 900° F. send for folder "Applications Unlimited."

For temperature requirements from 900° to 3000° F. send for "Breakthrough" folder.

BREAK THROUGH!

FOSTORIA

THE FOSTORIA CORPORATION • FOSTORIA, OHIO
MANUFACTURERS OF ENGINEERED RADIANT ENERGY EQUIPMENT AND CRITICAL WORK AREA LIGHTING

are supplied by Kimble Glass Co., a subsidiary of Owens-Illinois. **(314)**

NATION'S FIRST ready-to-eat oat flake cereal — Post Oat Flakes — is now in general distribution. A blend of oat, soy and rice flours General Foods product is described as "light and crunchy with a flavor much like oatmeal cookies."

New Product Shorts

Rudd-Melikian, Inc., Hatboro, Pa., well-known coffee and vending equipment manufacturer, is introducing four new liquid soup concentrates—chicken, beef, onion and vegetable.

H. J. Heinz Co. has added Piccalilli to its expanding roster of pickle products.

Procter & Gamble's New Crisco is now in national distribution. It's claimed to offer consumers a shortening with "twice the preferred unsaturates of other leading all-purpose shortenings."

Kraft Foods Co. is marketing Herb Dressing, the eighth in its line of products for salad dressing.

A. F. Murch Co., Paw Paw, Mich., has debuted a frozen concentrated apple juice in same size can as frozen concentrated orange juice.

Packaging Briefs

Patterned-foil decorative designs for some of the most popular foil container sizes have been developed by Ekco-Alcoa. All are available as stock items. **(315)**

Shrink-tight film for packaging frankfurters has been introduced by Packaging Film department of The Goodyear Tire & Rubber Co. Called Vitafilm ST, it's priced at 86¢/lb. in 1-mil thicknesses and has a yield of 21,500 sq. in. to the pound. Cited are non-fogging characteristics, superior gloss, excellent strength and heat-seal ability. **(316)**

CIRCLE 26 ON INQUIRY CARD

CIRCLE 27 ON INQUIRY CARD →

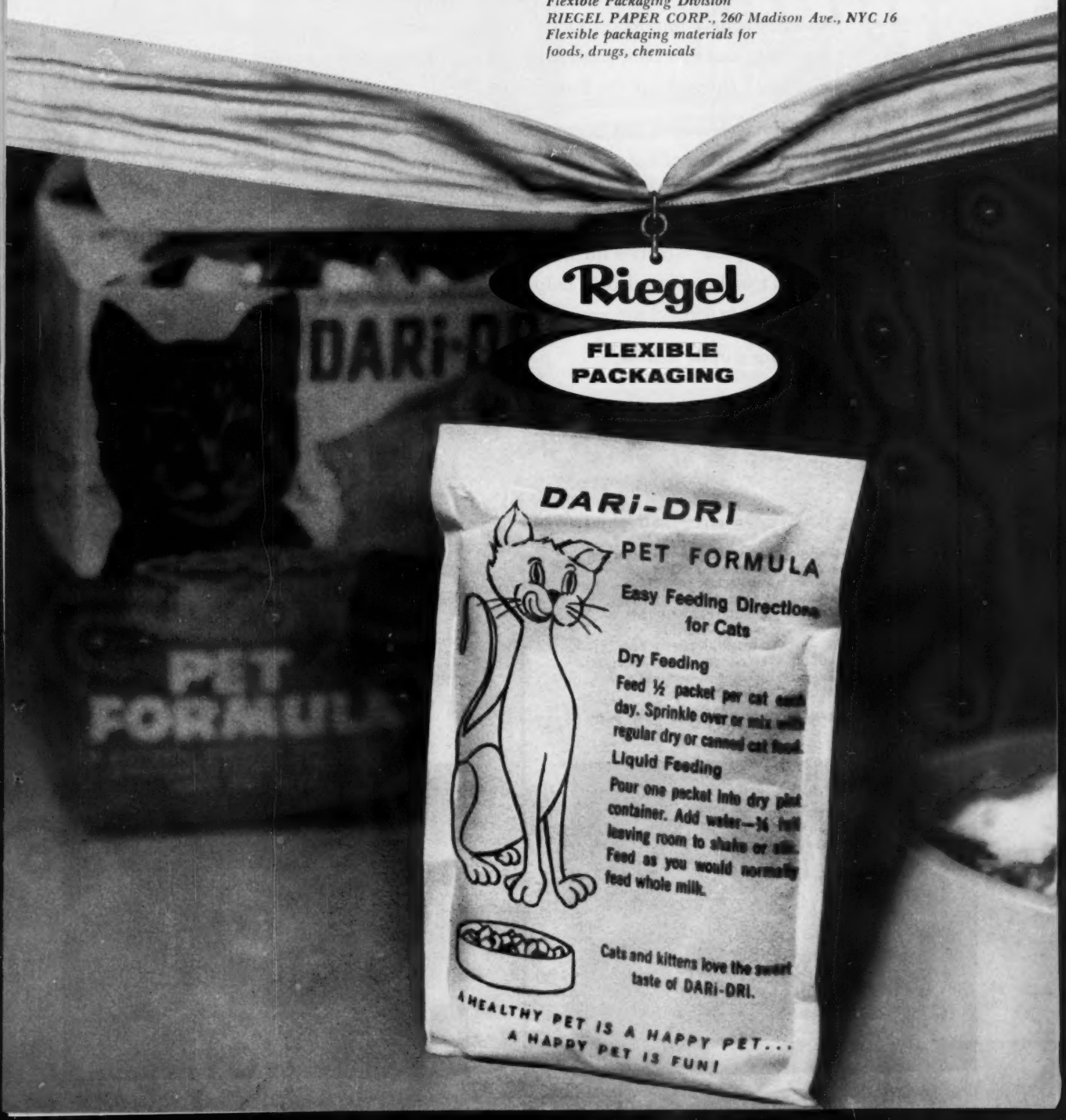
Diet powders for cats and dogs!
Fresh and wholesome in special Riegel Paper

New Dari-Dri natural dried milk dietary supplement for cats and dogs is protected with a special Riegel poly-coated paper, printed one color. Pouches formed and filled on machines by Bartelt, a Riegel subsidiary.

The hygroscopic nature of Dari-Dri's powdered dairy product requires just the right combination of protective qualities and economy in pouch packaging . . . precisely met by a special Riegel paper and coating.

We've a flair for thinking of every product as something special, and developing for it the one best packaging answer . . . be it pouch paper, glassine, foil, film . . . or combination . . . printed, coated or plain. Write for more information today . . . for the new ideas come from Riegel.

Flexible Packaging Division
RIEGEL PAPER CORP., 260 Madison Ave., NYC 16
Flexible packaging materials for foods, drugs, chemicals


Riegel
FLEXIBLE PACKAGING
DARi-DRI
PET FORMULA
Easy Feeding Directions for Cats
Dry Feeding
Feed ½ packet per cat each day. Sprinkle over or mix with regular dry or canned cat food.
Liquid Feeding
Pour one packet into dry pint container. Add water—¾ full leaving room to shake or stir. Feed as you would normally feed whole milk.
Cats and kittens love the sweet taste of DARi-DRI.
A HEALTHY PET IS A HAPPY PET...
A HAPPY PET IS FUN!

TRI-CLOVER

Products and Experience can help Automate your Processing Operations

Automation of food processing operations is becoming an increasingly important factor in determining over-all production capacity, and can be a contributing factor in the profit "picture" throughout the food industry.

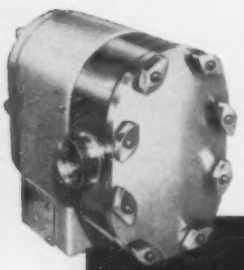
Tri-Clover Division has been actively engaged in the development and application of automated flow control systems. Established products have been improved and new products have been added to help bring production flow under positive control. And, complete facilities for the design, engineering and plant layout assistance needed to help you process the most product per man-hour expended are now available to you.

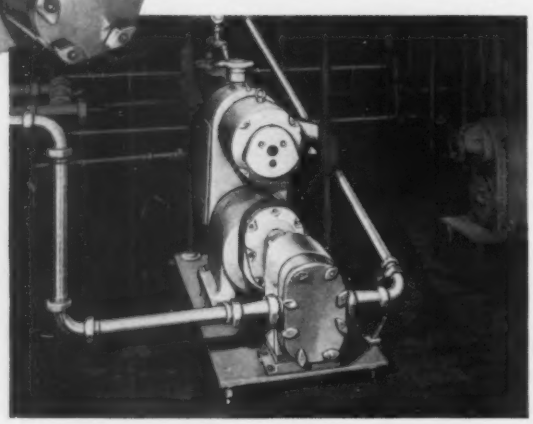
Write for further details.

NEW "PR" SERIES POSITIVE ROTARY PUMPS

This new high-efficiency series offers many exclusive features, including: FLOATING IMPELLER DESIGN; UNIQUE STATIC O-RING SEAL . . . FULLY ACCESSIBLE; RE-USABLE O-RING COVER GASKET; SEPARATE COMPARTMENT FOR OIL-LUBRICATED GEARS . . . and a popular size range including capacities of 3, 10, 25, 60, 125 and 300 gpm.

WRITE FOR BULLETIN "PR 260"

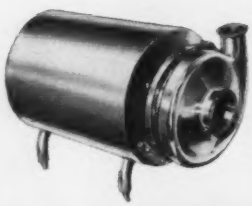


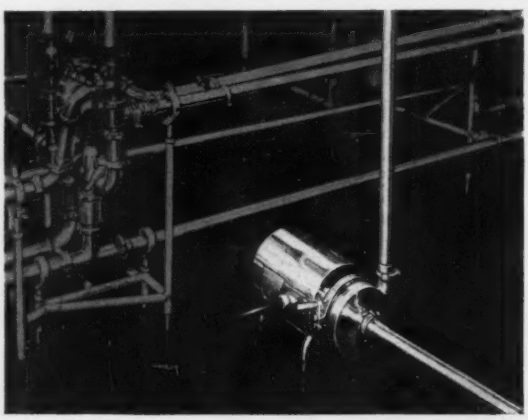


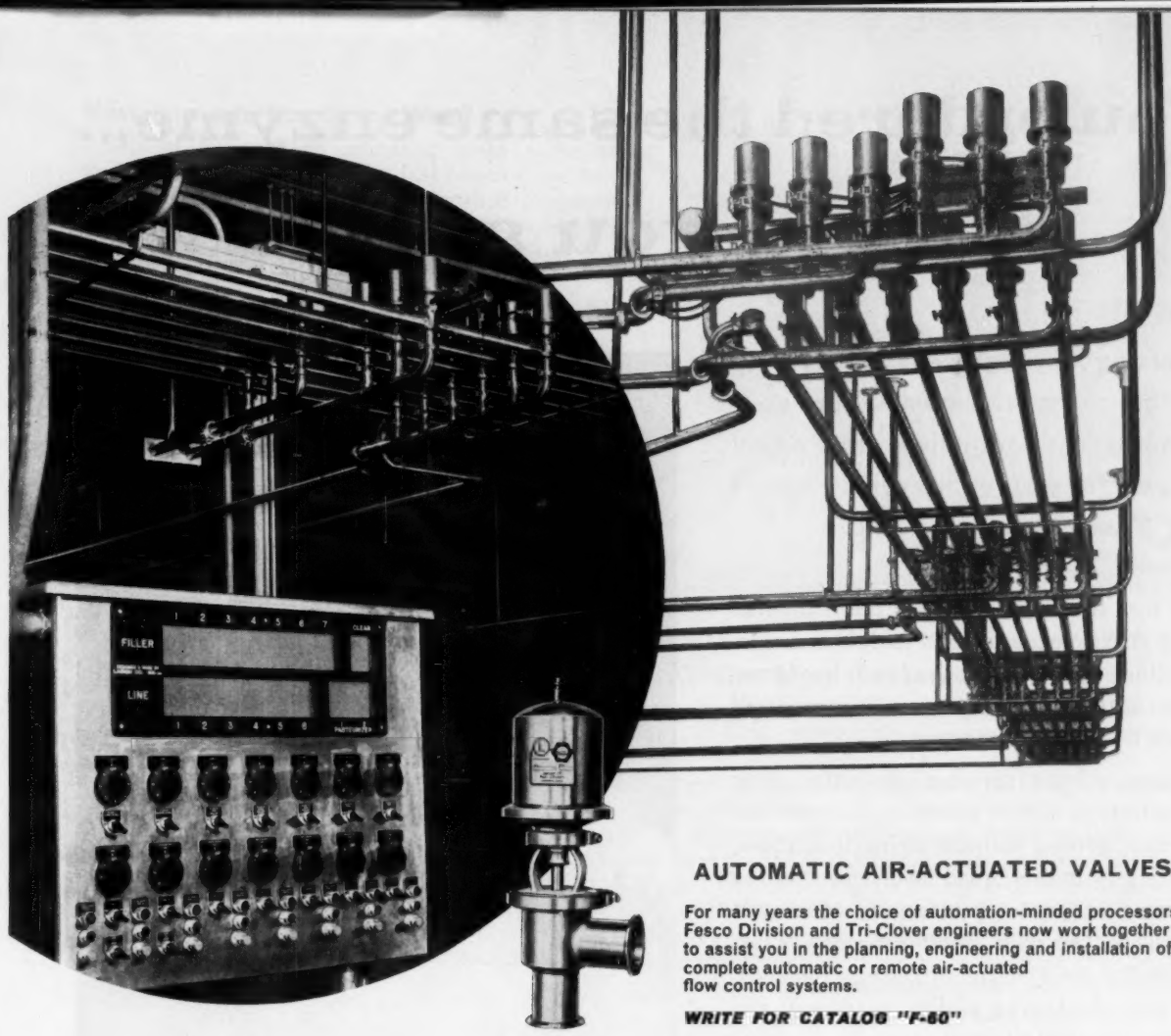
NEW "CIP" PUMP

This Tri-Clover Centrifugal Pump combines clean-in-place convenience with the efficiency of a fully developed volute-type head, one piece impeller and shaft, and one piece internal seal. It's a new concept in sanitary centrifugal pumps aimed at continuous "CIP" service.

WRITE FOR BULLETIN "CIP 260"





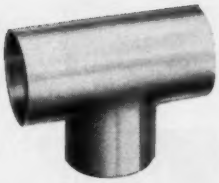


AUTOMATIC AIR-ACTUATED VALVES

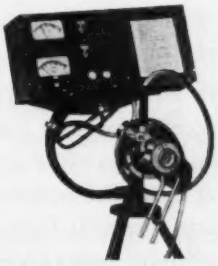
For many years the choice of automation-minded processors, Fesco Division and Tri-Clover engineers now work together to assist you in the planning, engineering and installation of complete automatic or remote air-actuated flow control systems.

WRITE FOR CATALOG "F-60"

"TRI-CLAMP" Fittings



"TRI-WELD" Fittings



"TRI-WELDER" Portable Welding Unit

AUTOMATION-ENGINEERED FITTINGS

A continuing program of product development and improvement has resulted in expansion of the Tri-Clover line of plug valves, sanitary stainless steel tubing, fittings and centrifugal pumps. Snap action TRI-CLAMP® take-down fittings, TRI-WELD® welded fittings and the TRI-WELDER® are fast becoming major cost reduction factors throughout the food industry.

WRITE FOR LITERATURE

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

TRI-CLOVER

In CANADA: Brantford, Ontario
EXPORT DEPARTMENT: 8 South Michigan Ave, Chicago 3, Illinois.
Cable TRICLO, CHICAGO

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CIRCLE 29 ON INQUIRY CARD

You ordered the same enzyme...

but did you get it?

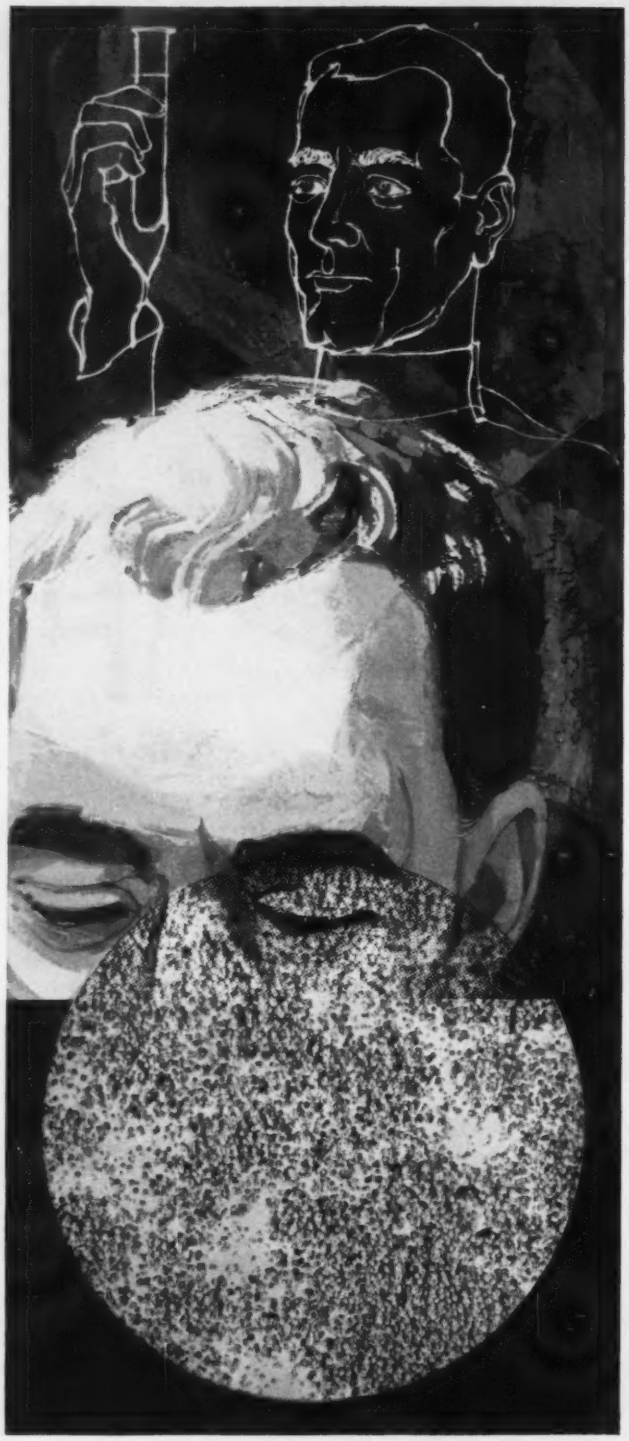
Selecting the right enzyme is only half the story. You must be sure your supplier can duplicate that exact enzyme for your every order. Here's why Takamine specialists can.

The fact that Takamine has more than 60 years enzyme experience is more than an interesting statistic. It's one of your best guarantees of thorough technical skills through all phases of enzyme production.

Takamine has experience in manufacturing the industry's widest selection of specialized enzymes. Refined manufacturing techniques, resulting from this broad involvement in the enzyme field, produce uniformity which you can rely on. Our wide selection means you can achieve the exact enzymatic activity you need. Our manufacturing ability means you can be sure of duplicating that exact activity batch after batch after batch.

There's a Takamine enzyme that will help you get "repeatable" results on your specific job . . . be it starch conversion, proteolysis, removal of pectins, glucose, oxygen, or others.

If you're now using enzymes to enhance flavor, protect color and stability, lengthen shelf life or to speed processing, or if you are considering the use of enzymes . . . let a Takamine enzyme specialist from Miles Chemical Company examine your process. Let him show you how precisely matched enzymes can help you get consistent quality.



MILES Chemical Company

Division of Miles Laboratories, Inc.,
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Clifton, N. J. — 772-4800
New York, N. Y. — MUrray Hill 2-7970

T-8-1

New Phase in Can-Price War?

Setting for another round of price jockeying among beverage cans was laid last month when Reynolds Metals said it will make finished aluminum cans and sell them directly to frozen citrus juice packers. Three packers—Minute Maid, Birds Eye, Winter Garden Citrus Products—already have their own can-making lines using Reynolds-made can parts.

Industry sources look on the move as a counter to the bid by the double-reduced tinplate to offset aluminum's gains. **It was reported that can-makers are pricing aluminum containers 39¢/1,000 above the level for cans made from thin tin.** By making its own cans, it is believed, Reynolds will be able to offer cans to the smaller packers (who do 50% of orange juice sales) at below this 39¢ spread.

Last season, 60% of the frozen juice pack went into all-aluminum or aluminum-body cans, Reynolds claims. The company expects the share to be "considerably higher" this season. Significantly, the captive can-making facilities of the three concentrators is said to have a combined capacity of 400-mill. cans, or about ⅓ of industry's 6-oz. needs. This hefty share, plus Reynolds move, indicates that the container fight is heading for another critical phase.

FDA OKs New Propellent

Du Pont's Freon C-318, which many look upon as giving the aerosol field a shot in the arm, received FDA's blessing last month. A combination of fluorine and carbon which exists as a liquid below 29F., propellent is said to enable whipped creams to stand up longer without "weeping."

The Freon is priced at around $5/lb. vs. 30¢ for nitrous oxide, 5¢ for carbon dioxide. But when used with nitrous oxide in the recommended 85%-15% mixture, Du Pont says, it will add only 1.3¢ to the cost of a 16-oz. can containing up to 9 oz. of whipped cream. While waiting clearance, the propellent has been tested by food makers for a variety of items, including foamed butter for use of crumbly biscuits. Mixtures of nitrous oxide and Freon C-318 will be available from Ohio Chemical & Surgical Equip. Co.

Rules for Cereal Packs

Cereal producers, whose packages received a thorough going over at the Hart hearings this summer, have adopted a "Principles of Good Practice" guideline. As set forth by the Cereal Institute, the principles state that net weight "shall be clearly and prominently shown" and, further, that it "shall be in good color contrast, without obscuring designs or vignettes."

Of special note is the section which spells out a ratio between size of type used for the net weight statement and the overall package area. This is the sort of ratio which is said to be a goal of the Hart group. The Institute recommends that net weight should be in boldface type in the following sizes: 8 pt. type where the main panel area is up to 25 sq. in.; 10 pt. where area is 26-50 sq. in.; 12 pt. for 51-75 sq. in.; and 14 pt. for an area more than 75 sq. in.

Packaging Pointers

Can-price war . . .

New propellent Ok'd . . .

Chains push packaging

Chains More Packaging-Minded

As food retail groups move further into marketing activities, they're showing more awareness of the power of packaging. This is especially true in the area of pre-packed produce, a Univ. of Delaware survey shows.

Produce executives of 44% of the responding firms said they are conducting "controlled research studies to pinpoint package costs and consumer acceptance." In 1959, less than one out of three had such packaging ventures, the university said. Nevertheless, a majority of the chain execs admitted they still did not know their retail packaging costs, on a commodity basis, as far as prepackaged produce was concerned.

BRIEFS

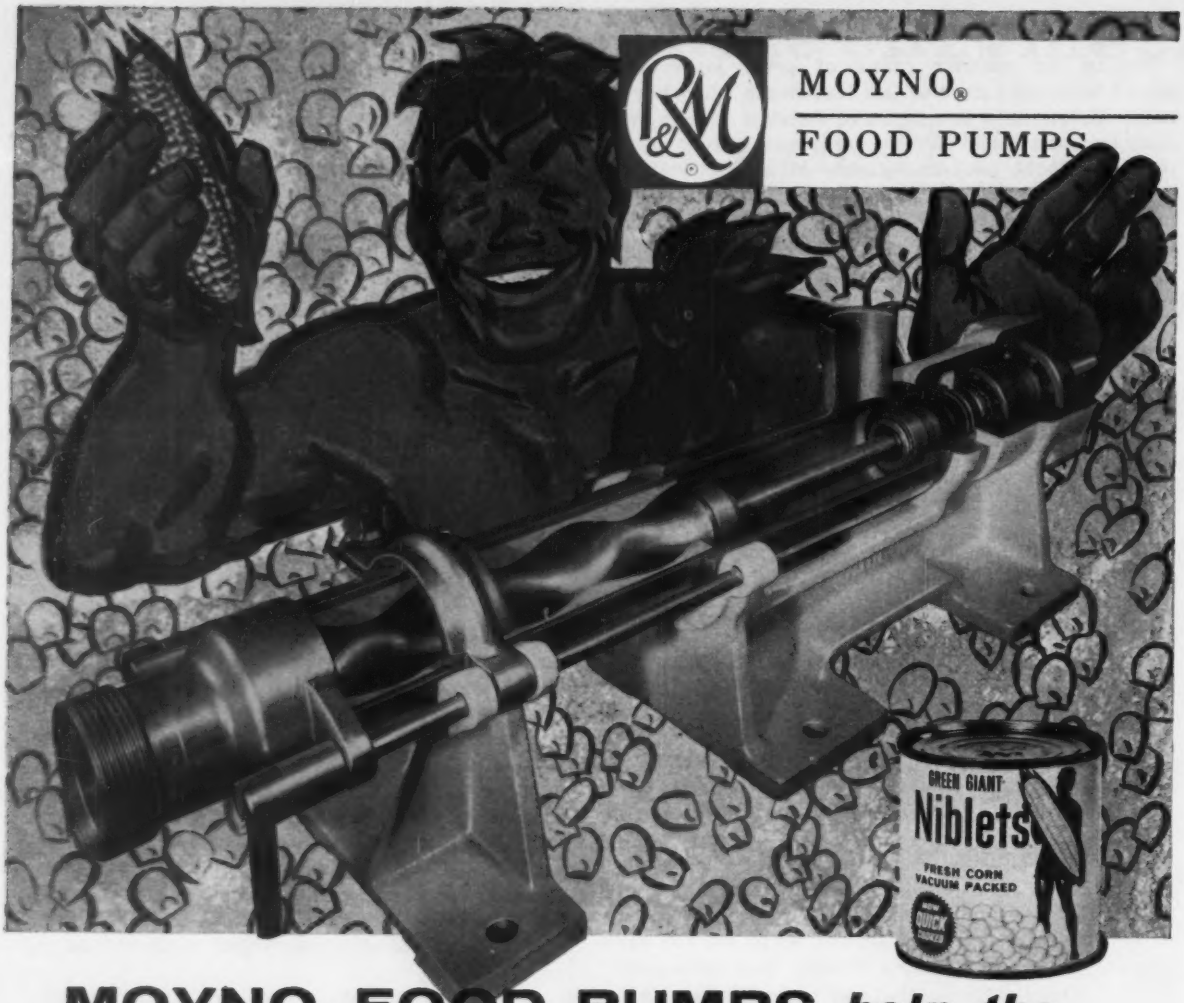
In '61 approximately 20% of all frozen strawberries will be packed in "Fibrematic" cartons.

An additional 5% savings in tinplate is obtained by Producers Container through use of "scroll die cutting." The cut-out portion on edges of tinplate is the area where the savings is gained. Producers adopted "spot coating" last year and produced substantial savings. Operation necessitated cutting enamel coating roller.

Prediction that two billion containers would be used by '65 for fresh and frozen baked goods, as opposed to 1.2 billion in '60, was made by Kaiser's J. R. Kitchum, foil container product manager.

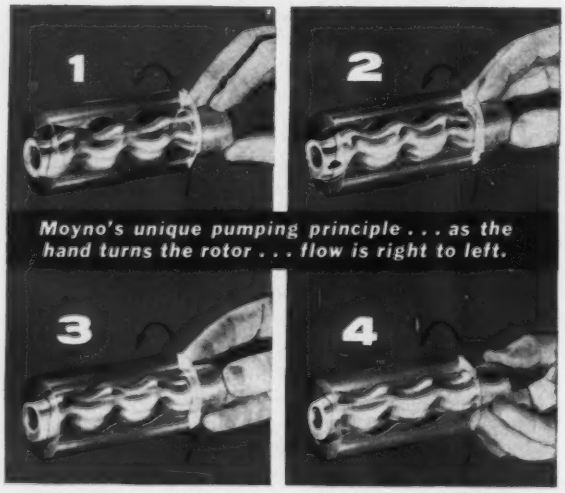
Tinplate in coil form has been ordered from The Steel Co. of Wales by Tin Plate Div. of Canco. Foreign firm offered Canco more attractive prices than American producers.

Expanded operations into packaging field has been inaugurated by C.I.T. Leasing Corp. on national scale. Firm offers leasing plans designed to special needs of packaging machinery users with terms from five to 10 yrs.



MOYNO® FOOD PUMPS *help the Green Giant keep the kernels whole!*

He's very fussy about the appearance of Niblets Brand corn, so Green Giant Co. uses Moynos to keep the tender kernels whole. Moyno's "progressing cavities" move all foods smoothly, without disintegration, pulsation, aeration or agitation! Variety ranges from thin soups to heavy peanut butter to chunky potato salad. Moynos keep foods pure, too! All wettable parts, except stator, are stainless steel. Stator can be stainless, synthetic rubber, odorless bakelite or other material. Smooth pumping elements can't lodge particles where bacteria might thrive. And Moynos can be dismantled, cleaned and be back on duty in minutes! Moyno food pumps are available in five sizes with capacities to 175 gpm and pressures to 75 psi. Write today for new Bulletin 100-FE.



Moyno's unique pumping principle . . . as the hand turns the rotor . . . flow is right to left.

ROBBINS & MYERS, INC., Springfield, Ohio

Fractional and Integral HP Electric Motors • Electric Hoists and Overhead Traveling Cranes • Moyno® Industrial Pumps
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Subsidiary companies at: Memphis, Tenn., Pico Rivera, Calif., Brantford, Ontario.

Flavor Research Brings Exciting New Era

Put the flavor factor from the mulberry leaf onto moistened filter paper, and the silkworm eats the paper heartily. But the worm gets no nourishment.

Conversely, all the nutritional requirements of man can be satisfied for 21 cents a day. But no one would eat the stuff.

As exciting as vitamin discoveries

This key role of flavor in nutrition is about to write a new chapter in food manufacturing. One scientist likens progress in identifying flavor constituents to the era of vitamin discoveries. With newer techniques, such as chromatography, as many as 20 to 30 chemical flavor substances have been identified in a particular food.

American Meat Institute Foundation is helping to unlock the secrets of the wonderful flavor of cooked meats. In the water-soluble fraction of meat, AMIF finds minute quantities of certain substances. When combined and heated, these yield the typical broiled steak aroma. Not all of these substances have been identified. But Dr. D. M. Doty reports that corn sugar, an unknown peptide, and inosinic acid are present.

In a certain flavor-yielding peptide, AMIF has identified at least seven amino acids. The major component remains unknown, however. It may turn out to be either something commonly known or something most unusual, Dr. Doty observes.

Top R&D scientists with food manufacturing firms are probing flavor, too. Among them is Dr. Carl H. Krieger of Campbell Soup. He is directing basic research toward identification of flavors and their precursors. His idea is not to duplicate flavor artificially, but to develop it naturally, as in the breeding and feeding of poultry or the growing of vegetables.

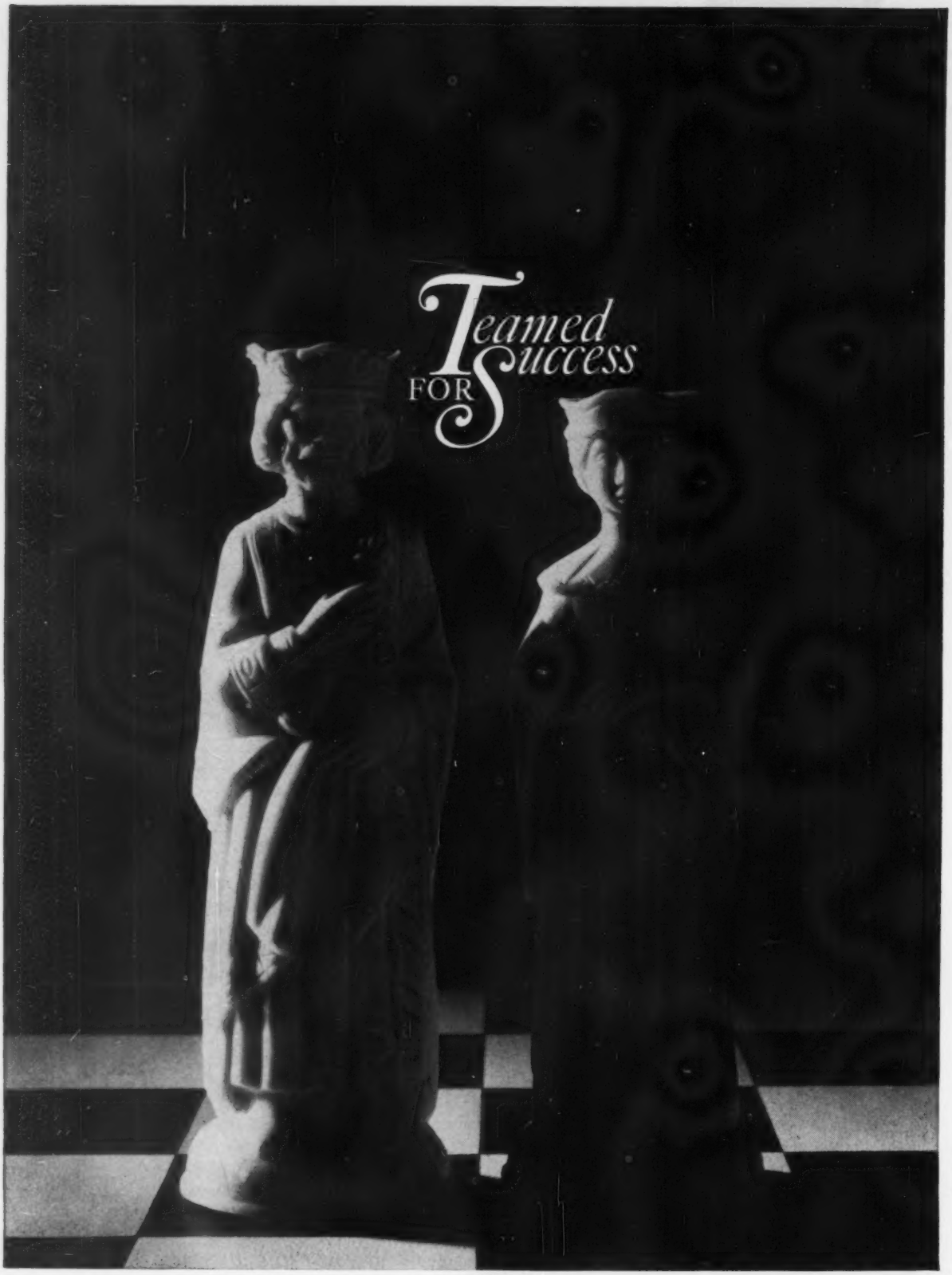
Campbell Soup Co. wants to know the answers to such questions as these: What produces the flavors in cooked meats? Why is durum wheat the best for macaroni? What makes some rices better for heat processing? How is it that some flours are better than others for sauces? What is the role of fatty acids in the flavor of dairy products?

Will lead to unusual new food items

Many other researchers in food company and university labs are studying the basics of food flavor. So you can look for some fascinating new knowledge.

Eventually the food industry will better control flavor and modify it to fit any specialized product, says Dr. B. S. Schweigert, well-known food scientist at Michigan State. Then there will be many more convenience foods with unique and distinctive flavors.

Big new opportunities are ahead.



America's Leading Firms and Kohnstamm! Many famous corporations consider Kohnstamm a confidential partner in developing or improving products. The same expert counsel in relating flavors or colors to your ideas, is yours for the asking.

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First producers of certified colors

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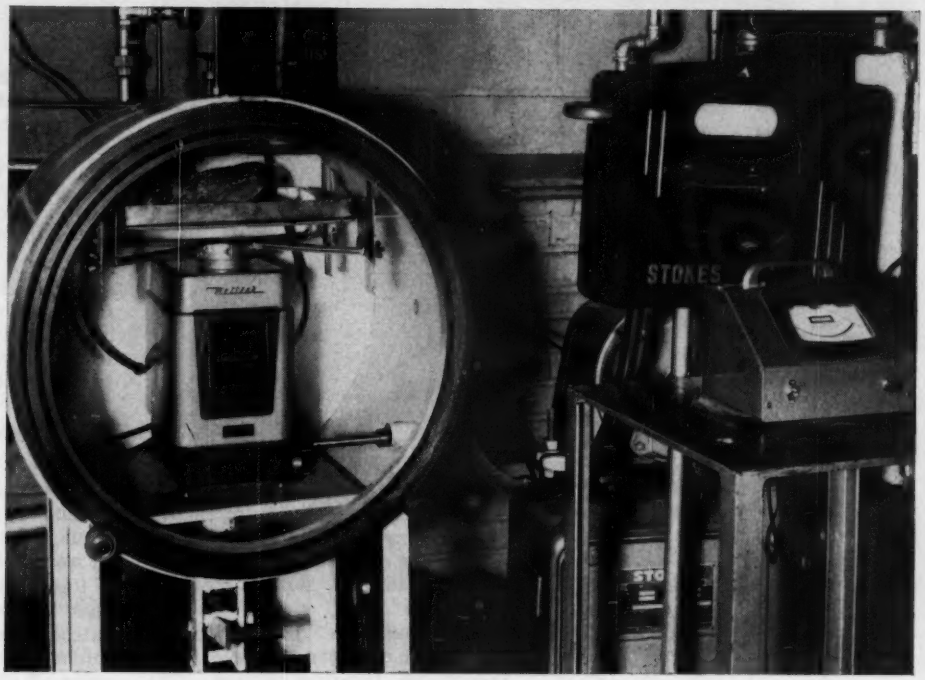
11-13 E. Illinois St., Chicago 11; 2632 E. 54 St., Huntington Pk., Calif.



FREEZE - DRY process plotter used by Stokes to predetermine short-cycle factors. Drying tray rests on precise lab scale inside freeze-drying chamber. Thermocouples check temperatures, gage shows vacuum.

Latest in Freeze-Drying

► *$2 billion sales in '70 seen*
► *Army wants large quantities*
► *Drying time and cost cut*
► *More installations abroad*

"TODAY, growth-minded investors are eyeing an improved food processing technique which may well top the gigantic growth pattern set by frozen foods.

"Sales of freeze-dried foods could possibly reach $2 billion by 1970.

"But the process is not without its problems. Costs still are relatively high (though considerably reduced over the past two years). Quality of food must be improved (perhaps by improved heating methods). Packaging is a problem (a dehydrated food is not particularly appealing through a cellophane wrapper). And it will take time to educate the public to accept freeze-dried foods."

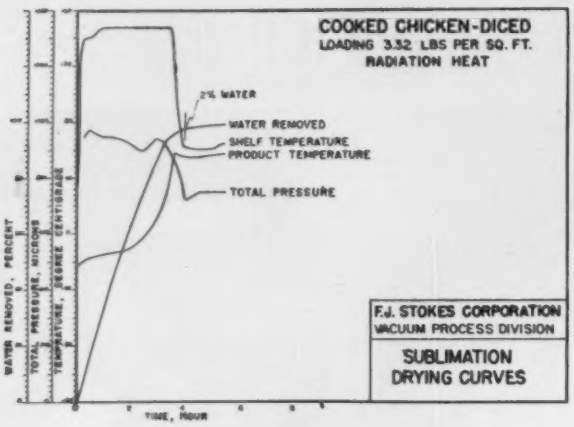
We quote from an advisory report to investors prepared by Danforth-Epply Corp., Wellesley, Mass.

The $2 billion-a-year forecast is challenging. Assuming an average price of 50¢/lb. (rehydrated), this would mean a 4-billion lb. annual output. Frozen foods reached a 6½-billion lb. level in 30 years.

The $2-billion figure seems optimistic. But in view of current developments and potential markets, it may not be impossible.

The problems cited in the forecast are being solved. Cost is coming down, quality is good and

FRANK K. LAWLER, Editor, "Food Engineering"



NEW SHORT CYCLE that cuts costs, improves quality. Secret is high initial shelf temperature, which is progressively lowered automatically to hold product temperature below 140F.

will be better. Packaging problems are not too difficult. Psychological acceptance is no problem when freeze-dried items are used as ingredients—or when served as fresh items after reconstitution in restaurants and hospitals.

Quick Cycle Cuts Costs

Aware of the cost problem and the challenge, F. J. Stokes Corp., Philadelphia, has tested processing techniques that may be the answer. A short-time, high temperature freeze-drying cycle is particularly significant. With it, expense may be cut to 2½ or 3½¢/lb. of water removed. (See also FE, Oct. '61, p. 41.) Quality is reported to be better because of shorter exposure to the rigors of processing.

Stokes finds that chicken now can be freeze-dried to 2% moisture in 4 hr., or 6 hr. at most. This compares with a 20-hr. cycle that runs the cost up to 10¢/lb. or higher.

The short cycle gives three instead of one production cycle per day, with no extra labor. It cuts both operating and fixed costs per pound considerably. It means three times the capacity with the same equipment investment. It puts freeze-dried foods in a near competitive situation with canned foods. It does better than that, in fact, when long distance shipping costs are involved.

The new technique involves a higher initial drying temperature and cycle control. Starting temperature is 300F., but this is lowered automatically to prevent product temperature from exceeding 140F. as moisture removal proceeds. Excellent freeze-dried chicken has been produced in 4 hr. with this procedure.

It may be possible to use 400F. at the beginning of the cycle to save another hour or more. Chicken was dried in 2½ hr. in this way, but it had a slight "toasted" flavor.

Time is saved, too, by starting to defrost the refrigerated condenser plates 30 min. or more before drying is completed. This readies the condensers for another batch with no delay between batches.

The condensers' plates are located in a chamber separate from the Stokes freezing cabinet. Defrosting is simple. The vacuum in the condenser is broken with steam at 2 or 3 psi. Since the ice formed under vacuum on the condenser plates is spongy, steam penetrates it and melts it quickly.

Defrosting water drains from the bottom. Then a two-stage steam ejector pulls a vacuum on the condenser to dry the plates. This takes little steam, and the evaporation of the water cools the plates before they go on cycle again.

Another advantage cited for the separate condenser is that heat radiation cannot reach the refrigerated plates and increase the refrigeration load.

A way to eliminate the 30 min. cooling time at the end of the cycle was patented by Flosdorf a few years ago. It involves breaking the vacuum in the drying cabinet with nitrogen. According to theory, the inert gas protects the product and makes cooling in the cabinet unnecessary.

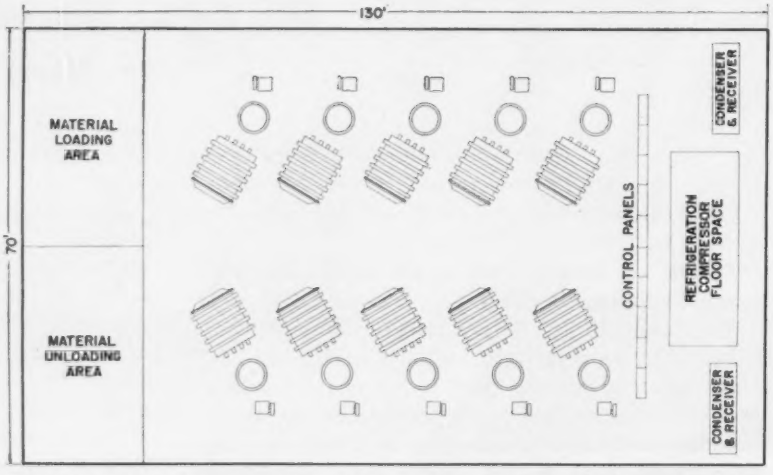
Stokes expects to have American freeze-drying cycles cut at least in half for all products within a year. It has demonstrated the possibilities in its laboratories.

Must Avoid Remelt

But food manufacturers still want a process that produces top quality products. So it is considered extremely important to avoid remelt in an attempt to cut drying time.

Research at Stokes has shown that flavor elements are precipitated on the cell walls of a product during freezing. These then do not come off excessively with the water vapor. But if remelt occurs during drying, the flavor elements go into solution again, and an excessive amount passes off with the vapor.

This was impressively demonstrated in freeze-drying garlic. Without remelt, there was no perceptible odor in the ice on the dryer condenser plates. But when remelt was allowed to occur, the ice had a sharp garlic odor.



30 TONS DAILY and up is capacity of freeze-drying plant laid out by Stokes. Its 10 cabinets are efficiently grouped for loading, unloading, control, and services. At least twice as big as any existing plant, it is planned to meet growing production needs.

Temperature must be kept low and vacuum high, to prevent remelt, Stokes believes. Requirements vary, of course, with different products. It is particularly severe with liquid foods, such as orange juice.

In most freeze-drying operations, Stokes uses an absolute pressure of 750-800 microns, with a condenser temperature of about −20C. In drying a liquid product with a low melting point, however, 300 microns and a condenser temperature of −35C. is recommended. Even 100 microns is employed in some operations.

Heat is applied to the product by radiation from panels heated by circulation of oil or some other heat-transfer fluids. This is pumped through a steam heat exchanger. Cooling at the end of the cycle can be done by chilling the heat exchange medium.

A vacuum pump serves each drying cabinet, and noncondensible gases that come off with the water vapor pass through this pump. Condensibles, of course, collect on the refrigerated plates.

Cabinets such as those at Lipton have 300 to 350 sq. ft. of drying area each and handle 1,000 lb./hr. But Spice Island, San Francisco, dries a ton of beef extract per batch in a 1,100-sq. ft. cabinet. Today's plants are small, but a 30-ton and more per day layout has been designed by Stokes.

Capital investment required for a freeze-drying plant is about $200/sq. ft. of drying area. Cost factors involved in freeze-drying are spelled out in data supplied by John F. Maguire, Manager of Stokes' vacuum process equipment division. The following data are for a simplified plant with one condenser per drier and a single refrigeration plant (no standby):

► **Total installation cost,** $241,000 plus utilities.

► **Total process costs,** $365/day, or 4.2¢/lb. of water removed. Amortization, $110/day, or 1.16¢/lb. of water removed. This adds up to 5.36¢/lb. of water removed, or 4¢/lb. of product dried.

The plant could process more on a shorter cycle and reduce the cost below 4¢.

Another plant is designed for 11,520 lb. of daily production, or the removal of 8,640 lb. of water daily. It operates at a total cost of 5.9¢/lb. of water removed, or 4.5¢/lb. of product.

This is a 12,000-sq. ft. turn-key plant, including dryers, condensers, refrigeration, vacuum equipment, heating and cooling equipment, trays and track. Costs include utilities, labor, and amortization over a period of 10 yr., at 5% interest. Operation for 300 days a year is assumed.

DEHYDRATED DINNER is one of quick-serve meals developed for armed forces. It consists of freeze-dried chili con carne with beans, plus dehydrated applesauce, milk and coffee and canned bread, a candy bar and peanut butter.

Loading is 4 lb./sq. ft., cycles are 10 hr. long, product has 75% moisture content. The plant has four 7½ hp. vacuum pumps, eight ½ hp. circulating pumps, 60 tons of twin refrigeration with two 75 hp. compressors.

► **Total cost for electricity,** at 3¢/kw. is $99/day.

► **Steam cost** at $1.5/1,000 lb. (high) is $43.20/day.

► **Labor** is two men for three shifts, or 6 man days, which at $5/hr. (high) costs about $240/day.

► **Total processing cost** equals $382.20/day, of which labor is the major factor.

This is a very elaborate plant, and the capital investment is $312,000. A big, four cabinet American plant, with refrigeration and handling equipment, runs from $300,000 to $350,000.

Obviously the cost per pound of product could be greatly reduced by shorter cycles—perhaps to 4 or 4½¢/lb. of water removed. Also, the labor rate and steam cost are much higher than normal in this cost analysis.

How Big the Market?

If costs and quality are suitably low and high, respectively, there is a big potential market for freeze-dried products.

. . . **The military** is receptive to the quality, loves the advantages of freeze-dried products logistically, and offers considerable potential demand.

. . . **Americans spend** about $500 million/yr. for soups, 6% of which ($30 million) represents dry soup mixes. Expensive freeze-dried items are going into dry soups.

. . . **Some 25 billion meals** are served by restaurants yearly. We see freeze-dried shrimp succeeding in this market. We know that other freeze-dried products can extend the menu of small restaurants without taking up refrigerator space. They also provide portion control and save preparation labor.

. . . **The cake and pie mix** sales are growing rapidly, and dehydrated fruits should find a ready market there.

. . . **Dessert and pudding mixes,** cold breakfast cereals, salads, and baby foods all are possible users of freeze-dried ingredients. These all are big volume items in America.

. . . **American campers** spend $50

million/yr. for food, and freeze-dried products should do well in that market.

Areas of the world with little or no refrigeration are important potential export markets.

Sum it all up, and add some markets that probably have not occurred to us, and what do you have? We'd say $2 billion is a good target for our industry to shoot at.

Army's Requirements

Quartermaster Food and Container Institute has developed modern new military field rations based upon dehydrated foods, including freeze-dried items. It is in the market for freeze-dried foods on a gradually increasing basis. Freeze-dried chicken and shrimp were introduced into the Army supply system in the past fiscal year. Late next year, or early in 1963, the Army and Air Force plan to use approximately 500,000 lb. of freeze-dried meat, poultry and seafood. Additional quantities will be procured for Navy feeding. Another 100,000 lb. will be bought by the Quartermaster in '62, and 150,000 lb in '63, for production testing. There will be still further requirements for field testing.

Certain components of the Army ration are maintained in a mobilization reserve. This supply is rotated, and new stocks, where applicable, will be freeze-dehydrated. Freeze-dried chicken pieces currently are replacing canned chicken. Annual requirements for this purpose alone are out at 150,000 to 170,000 lb. annually.

Adoption of other freeze-dried items for the mobilization reserve ration ultimately should result in a continuing yearly requirement of about 1,750,000 lb.

Great quantities of freeze-dried foods could be required in the future for the armed forces operational rations. For 21 Quick-Serve Meals involving dry products, the amount of freeze-dried items to feed 100,000 men continually for one year would be as follows:

Meat, poultry and seafoods, 9,120,000 lb.; vegetables (corn, peas, and spinach), 900,000 lb.; fruits, 700,000 lb.

The Uncooked Meal item of the Army ration may embody freeze-dried foods in about the same proportion as Quick-Serve Meals. If so, future expeditionary force of one million men would increase the above requirements ten-fold.

QUICK-SERVE MEAL being prepared by soldiers during field exercise. Feasibility and acceptance of the meal concept and components were tested.

Price Must Be Right

Here is how the Quartermaster attitude toward freeze-dried foods was summed up by Robert L. Graf, in his talk at the Military-Industry Conference in September:

"We recognize that there is still progress to be made in freeze-drying. Products can stand improvement. But most of the freeze-dried items already have surpassed their canned thermally processed counterparts."

Mr. Graf then cautioned packers:

"We have heard many estimates of freeze-drying costs, some as low as 2¢/lb. of water removed. We recognize that existing facilities will not ordinarily provide such low production costs, but we regard most currently quoted prices as extremely out of proportion to reality.

"As in the civilian market, the military soon must be able to realize significant reduction in quoted prices sufficiently to put freeze-dried products in near competition with canned. The high price can kill the market almost as easily as poor quality."

More Plants in Europe

Europe continues to move ahead in freeze-drying, too. Activity there was summed up by John H. Nair at the Military-Industry conference as follows:

Irish Sugar Co. is getting into commercial production with four Vickers-Armstrongs AFD cabinets (FE, July '61, p. 37).

Brook Bond in England is producing freeze-dried coffee in four Mitchell Engineering units. The coffee extract is frozen on trays, and heat is applied by plates above each tray and by circulating trichlorethylene through the tray. Liquid coffee can be loaded and dried powder removed while the cabinet is shut. Capacity is 2,700 lb. weekly.

Unilever is about to install two Vickers-Armstrongs chambers at Aberdeen, Scotland. These units are rated at 1½ tons raw material capacity.

Nestle is reported to be erecting a freeze-drying plant in Cumberland, England.

J. Lyons & Co. bought the Atlas plant formerly at Aberdeen. The firm is starting market tests of a variety of packs. It may use its chain of restaurants as an outlet for the products. A/Atlas is market testing in Aberdeen an instant tea made by freeze-drying a brew without concentration of the extract.

In Holland, Unilever Ltd. has two Leybold chambers, and these have been in operation for some years, primarily drying chicken for dry soups. Experiments have determined that chicken dices can be freeze-dried satisfactorily for soups in 4 hr. It is understood that the capacity of the plant will be doubled in the near future.

A subsidiary of Amstel Brewing in Breda, Preservenbedrijf, N. V., has three chambers in operation. One is an Atlas, the others are the company's own design, with 400 and 600 sq ft. of shelf area, respectively. Throughput is about 3,500 lb. Being dried are cauliflower, mushrooms, strawberries, bananas, raspberries, and chicken meat.

Royal Hollandia Milk and Food Co., Vlaardingen has six Atlas chambers in operation on a variety of items.

Maggi G.m.b.H. is producing freeze-dried soup ingredients (meat pieces and vegetables) in a single Atlas cabinet at Singen, West Germany.

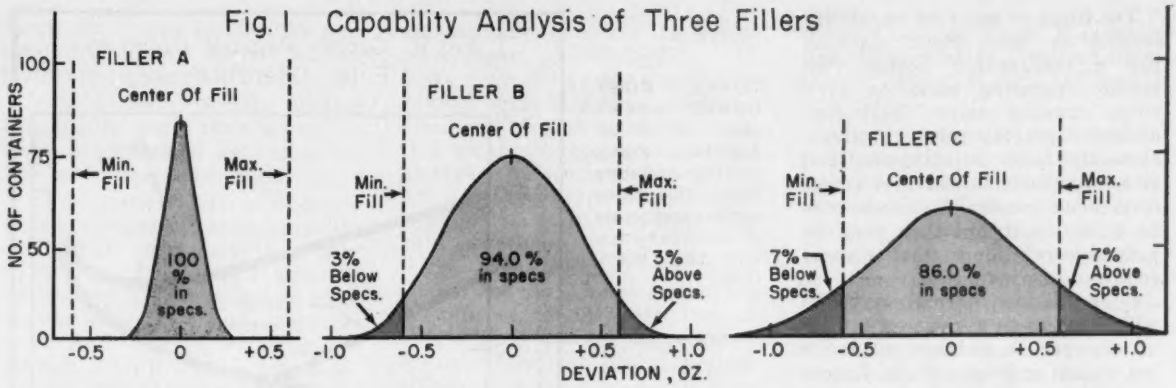
Knorr is reported to have one or more Leybold cabinets in its Swiss dry soup plant.

Dalhoff and King (N. Z.) Ltd., Wellington, New Zealand, is freeze-drying a variety of foods in an Atlas unit.

Canada inaugurated commercial freeze-drying in May. Essex Packers, Ltd., Hamilton, Ontario, has a Vacudyne unit built to the design of Dept. of Defense Production. Meats, stew, turkey and chicken are processed.

Freeze-Dry Products, Ltd., is making an installation at Slack Bros., Ltd., Waterloo, Quebec, to dry 3 or 4 tons of mushrooms daily. (End)

Fig. I Capability Analysis of Three Fillers



PERFORMANCE curves show: Filler "A" is on target, "B" needs minor resetting, and "C" requires major overhaul.

Here's How To . . .

. . . Curb Equipment Failure

. . . Cut Maintenance Costs

PART I—Operations Control

THE BEST WAY to keep food-processing equipment in top-notch operating condition is to spot trouble before it starts.

Thus, here are latest engineering-management statistical techniques—"tools" that minimize combined costs of production downtime and equipment maintenance.

Three of these advanced methods will be described here. A fourth, Machine Wear Charting, will be detailed in Part II of this article, appearing in the next issue of FE.

Today's increasingly complex and expensive maintenance problems are being attacked by diverse methods, such as:

1. Machine Capability Studies. They evaluate accuracy and precision of fillers, formers, etc.

2. Maintenance Cost Accounting. It determines the cost of that amount of maintenance which minimizes total costs of preventive maintenance and equipment idle time due to breakdown.

3. Operations Research Maintenance. These techniques give data on which to base such decisions as:

. . . **When to replace** equipment whose efficiency decreases with time.

. . . **Whether to replace** units, whose efficiencies are fairly constant until time of failure, when they fail or on a regular basis.

R. D. KORNBLUM, Operations Research Div., Armour & Co., Chicago

1. Machine Capability Studies

With these techniques production management can:

. . . **Forecast the amount** of routine adjustment maintenance needed to keep processing, packaging, and filling equipment operating within desired quality specs for such product characteristics as weight, dimension, etc.

. . . **Use "sensitive" maintenance records** to show how past maintenance of processing equipment will affect production and quality variations.

. . . **Determine before equipment is used** for new production whether it can ever turn out a satisfactory percentage of product within desired quality specifications. If the answer is no, an aggravating and expensive maintenance job that could not correct the situation is avoided.

Machine capability studies are relatively simple and can be carried out by a plant statistical quality control (SQC) engineer, or by an industrial engineer with some SQC training.

The basis of machine capability studies is this: Each machine has a measurable normal, inherent operating variation even when running under ideal conditions — precise initial settings, correctly-timed adjustments, and at equipment-manufacturer's recommended speeds. Variations may be quite small, but they must be judged in relation to quality specs required of production.

Such random, normal variation will show up on a volumetric filler as changes in finished product's net weight or height of fill. Extent to which such random, normal variation turns out product which exceeds, or is within, quality specs can be measured.

Let's detail a machine capability study by using a hypothetical, but realistic, situation involving three volumetric fillers, each with eight filling heads. These fillers have been used for one product and then switched to another—a new one that presents a problem. It's to be filled into an institutional-size container of 10-lb. net weight. Required quality specs are ± 0.6 oz. of declared 10-lb. label weight.

Weight variation above and below declared weight, within certain controlled spec limits, is permitted by some governmental agencies. However, many local regulatory agencies require no underweights. Result is that machine "center" fill target would have to be above declared label weight. In this example, "center" of fill would then be declared label weight +0.6 oz., and specs would be ± 0.6 oz. around this "center." In either case, however, techniques of machine capability are the same, only the "center" of weights is moved.

First step is to make careful initial settings for each of the eight filling heads by making trial runs with new product. Product is kept at constant density to eliminate this cause of variations in net weights. Next, a series of verifying test runs are made to check net weights from each filler head to make sure each is **centered** or declared net label weight.

Here, SQC control chart techniques are employed to make certain each head is "on target." If not, adjustments must be made, and test repeated.

Now, using experienced machine operators and running at normal production speeds, filled containers are collected from each machine and identified from each filling head. In our example, each filler produces 400 consecutive filled containers. So there are 50 consecutive identified samples from each filler head. This number of samples is sufficient to measure capability, yet is not excessive to introduce a machine-wear factor.

Containers are then emptied, contents weighed, and net weights recorded for each filler head.

At this point, let's assume that SQC charting methods show heads on each filler to be operating on target. We can then pool the individual heads' samples to represent machine's output. Otherwise it would be necessary to re-adjust or repair faulty heads. And if this were not possible machine's output (total of all heads and out-of-control heads) would have to be taken.

Each filler's production is plotted (Fig. 1). The vertical scale for each filler shows number of containers in any specified net weight class. Desired quality specs of label weight (10 lb.) + 0.6 oz. are represented as vertical lines for each machine's output. A net weights curve for each filler is then plotted from SQC results. From such curves, percentages of product inside or outside of required specs are determined.

Filler A shows that all its weights are within specs. Filler B has 6% of its weights outside of specs (3% over and 3% under). And filler C reveals 14% out of specifications (7% above and below). These weight spreads represent random, normal variations inherent to each machine. They are the machine's net weight capabilities.

This study provides maintenance management with data for making such decisions as:

. . . **Running filler A** since it is operating satisfactorily, with minimum adjustment to hold weights within desired specs. Further capability tests on filler A might reveal need to increase its speed to take advantage of a weight spread that is well within specs at normal operating speed.

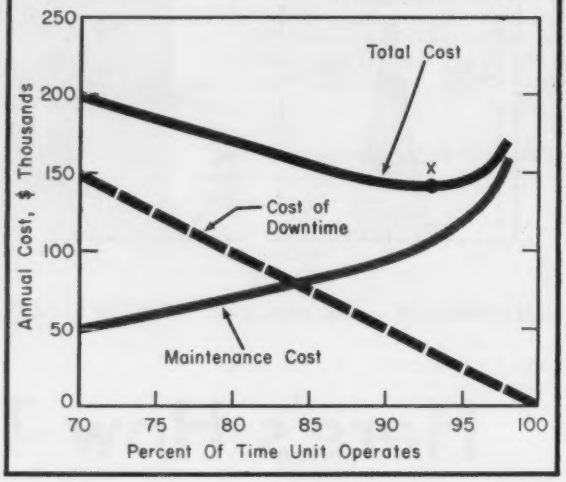
We don't assume, however, that actual production runs at filler A's normal speeds won't need adjustment maintenance. What we do know is that A's routine adjustment maintenance demands will be less than fillers B and C operating at comparable speeds. And, as we also know, A will produce more product within specs than B and C.

. . . **Doing a major overhaul job** on filler C, followed by post-repair machine capability studies to evaluate overhauling. Reason is that filler C doesn't perform satisfactorily on the new product. Even under best operating conditions and maximum adjustment maintenance, filler turns out 14% of its production outside specs.

. . . **Performing an amount of adjustment** maintenance on filler B that is mid-way between that needed for the other two fillers. Even so, B will produce 6% of its filled containers outside of net weight

TOTAL - COST CURVE shows point (X) of diminishing returns —93% operating time. This curve summarizes costs of maintenance and filler downtime.

Fig. II Curves Pinpoint Optimum Filler Operation



specs, but could handle the new product if quality control inspection were tightened.

In addition, capability studies can also be used after major repairs are made to determine efficiency of these overhauls.

After initial studies indicate which equipment meets quality specs, SQC charts are then used daily to control quality of product. Such control charts signal when routine adjustments or other repairs and process changes are needed. They'll also tip off unsatisfactory machine performance, regardless of adjustment. And, at this time, major overhaul is in order.

A further bonus of such analyses is the occasional determination that a machine turns out product well within specs. In the case of filler A, its speed can be increased to a point where product approaches spec limits. Or, management may wish to run the unit "as is" to reduce QC inspection levels and costs.

Still another possibility is to again let the equipment produce at the normal speed of the original capability study, while easing up on some other hard-to-hold specification. Example is to loosen up product density control to spread the former narrow weight curve outward.

2. Maintenance Accounting

Objective here is to provide an answer to the "point-of-diminishing-returns" problem—that point of machine efficiency beyond which additional operating perfection won't justify extra maintenance.

Fig. 2 represents a graphical method of tackling this problem. Equipment considered is a bank of five volumetric fillers in the beverage field. Operating efficiency is expressed on graph's horizontal scale as "% of total available production time that fillers are operative." "Available production time" indicates proper allowance has been made for non-repair shutdowns, caused by material shortage, preventive maintenance, labor problems, etc. Vertical scale charts yearly cost ($1,000 units).

Curve labeled "maintenance cost" represents relationship between filler maintenance costs (preventive and repair) and various filler operating efficiencies. This cost is shown to rise steeply from 90% operating time. "Cost of downtime" curve shows costs charged to varying degrees of production idle-time due to equipment repair.

We can plot downtime cost against operating time efficiency. This cost is a straight-line function which, as expected, is highest at lowest percentage of operating efficiency, and drops to zero cost at hypothetical 100% operating time (0% downtime).

Top curve (Fig. 2) expresses sum of downtime and maintenance cost curves. Vividly seen, then, is the "point of diminishing returns." At approximately 92% operating efficiency, total cost curve rises and, at about 94%, it shows a sharp upward trend. Unless there is a valid reason to operate fillers above 94% of the available production time, preventive and repair maintenance aimed at keeping the equipment over the 94% level is not justified. Although unit production costs above the 94% level might drop to such a low figure that they offset skyrocketing maintenance costs, such is generally not the case.

Of course, this cost accounting technique is applicable only if current, accurate accounting data are available. If the data are not being accumulated as part of the plant accounting process, a "tighter" cost accounting program is indicated—and for critical uses besides the one outlined.

3. Operations Research

This assist to management's maintenance problems is best handled by a trained operations research (OR) analyst. If the company isn't large enough to sustain its own OR group, a consultant may be called in (FE, Nov. '60, p. 42).

OR can be employed in attacking maintenance problems by guiding management in decisions on:

1. **When to replace equipment** that is becoming less efficient and is in need of increasingly more maintenance over its period of use.

OR methods are employed to build a mathematical model that represents cost factors inherent in present equipment as well as equipment considered for replacement. After all data are taken, mathematical model is solved. It provides quantitative answer on which course of action (replacing or using present equipment) will offer least cost, and by what margin.

Here are cost and credit factors usually included in such a study:

. . . **For present machine**—maintenance cost, unit cost of production, salvage value (realized upon sale at time of study), and rental fees if any.

. . . **For proposed equipment**—purchase price or rental fees, estimated unit cost of production and estimated maintenance costs.

Significance of OR is that, once general mathematical model has been constructed, the problem can be evaluated for various conditions. Examples: Proposed time of replacement or various types of replacement equipment. Here, the same mathematical model is employed, but data appropriate to each case is "plugged into" the model.

2. **Whether to replace** machine parts individually when needed or as a group at some time before a large number of them fail.

With this technique, mathematical estimation of probability of part failure is also a factor. Considered is the fact that per item replacement cost is lower when a group of parts must be replaced before one of them fails—even if more parts are replaced than when one is replaced each time something goes wrong.

Somewhere between group replacement before failure and individual replacement upon failure, there are a number of replacement policies. Each has a number of unit replacements that usually can be closely predicted by probability methods.

OR technique informs management when a minimum-cost replacement can be made. Considered, here, are costs of replacement units and service. The mathematical model can also be designed to consider cost for lost production time attributed to individual or group replacement. Latter can usually be scheduled for non-production time.

A computer is often employed to evaluate the OR model. This is especially true because of the probability aspects of the model as well as the many alternative group replacement time policies that must be considered.

See next issue of FE for Part II of this article.

REFERENCES

Duncan, A. J., "Quality Control and Industrial Statistics." *Richard D. Irwin, Inc., Revised Edition, 1959.*

Juran, J. M., "Quality Control Handbook". *McGraw-Hill Book Co., 1951.*

Burr, I. W., "Engineering Statistics and Quality Control." *McGraw-Hill Book Co., 1593.*

Grant, E. L., "Statistical Quality Control." *McGraw-Hill Book Co., 1952.*

Churchman, Ackoff, and Arnoff, "Introduction to Operations Research." *John Wiley & Sons, 1957.*

ALERT EMPLOYEE calls foreman's attention to safety hazard at CP's Argo, Ill. plant. "Safety consciousness" of this type has become routine in wake of firm's stepped-up safety program.

New Twists Spur Plant Safety Program

Corn Products does basic research in plant safety—comes up with surprising answers. Puts zip into employee "safety consciousness"

AN INTENSIVE ATTACK on industrial safety hazards that includes for the first time a written safety policy for company-wide application, is now under way at Corn Products Co.

Although a pioneer in the field of plant safety, with a history of consistently declining accident rates, CP has experienced a leveling off in the reduction of accidents in recent years, prompting a new look at all aspects of safety activity. Results revealed two major needs: A re-defining of responsibilities in various areas of plant safety; and consolidation of the best features of many programs, already ineffect in various company plants, into one company-wide program.

The new policy, as adopted, is an attempt to fill these fundamental and basic needs.

JOHN M. JENSEN,
Director of Safety, Corn Products Co., Argo, Ill.

In essence, the new Corn Products safety policy:

1. **Establishes an executive safety committee.** The committee, comprising the manufacturing v.-p., plant managers, general manager of engineering, and director of industrial relations, meets each quarter and is responsible for the overall safety program.

2. **Defines responsibility.** Policy specifically spells out the joint responsibilities of management and the employees — management to provide and maintain a safe place to work; employees to assume responsibility for their own safety and for the safety of others.

3. **Establishes duties and procedures.** Specific duties of plant supervisors, plant safety director, company safety director, and executive safety committee are outlined.

4. **Establishes safe working methods** and provides training for employees in following these methods. This procedure involves setting up and enforcing safety rules for personnel working on hazardous operations.

5. **Recognizes safety as a personal philosophy.** From a personal standpoint, safety is, or should be, a "way of life—a philosophy of living."

6. **Develops a climate.** This will assure both regulatory control as well as voluntary acceptance of the philosophy of safety by employees.

7. **Urges a concern for accident-prevention** off-the-job as well as on-the-job. Such a "way-of-life" concept recognizes that an individual must be safety-minded 24 hours a day, not just the eight hours he is in the plant.

Announcement & Training

The new policy was announced to CP employees in an article by the manufacturing v.-p. published in

the company house organ. A new company safety manual containing details of the policy was prepared and given to each employee by his supervisor. Simultaneously, each supervisor discussed the new policy individually with his men.

Supervisors had previously been introduced to the new policy by plant managers at the company's annual safety banquet.

Under the new policy, supervisors assume responsibility for:

1. Investigation of all serious accidents involving their employees.
2. Monthly safety inspection of their department.
3. Monthly individual consultation with employees on safety practices and principles.
4. Maintenance of safe conditions in their department and enforcement of all safety rules.

To assist supervisors in carrying out these functions, a five-session supervisors' training program was developed and conducted in each plant during the year.

This program encompasses:

1. Integration of safety with production.
2. Recognition of accident causes.
3. Application of effective control measures.
4. Methods of improving the skills of inspection, accident investigation, and employee training.

Basic Accident Problem

Some years ago CP made an analysis of the accident hazards in their plants. They found that if they were to build a new plant, incorporating all of the most up-to-date guards and safety devices, and maintained this equipment in perfect condition, they would eliminate only 20% of their injuries.

CP then considered the remaining injuries resulting from hazardous jobs. Assuming that they analyzed each of these jobs, developed a safe job procedure, and trained their employees in these procedures, they found that they could only expect to eliminate another 30%.

Therefore, by utilizing every scientific approach to safety engineering, CP could only hope to decrease their accidents by 50%. Company was further surprised to learn that only 50% of their employees could be assumed to be performing hazardous jobs at the time of injury; whereas, the remaining 50% were injured doing non-hazardous jobs which could have happened at home, or in other activities not connected with in-plant work.

This latter 50% comprised accidents which could have been prevented by alertness and good judgment on the part of the worker.

If individuals in the first two categories (20% comprising injuries resulting from imperfect conditions, and 30% comprising accidents which occurred because safety rules were ignored) had exercised good judgment, how many of these accidents would have been eliminated? An analysis proved this to be a surprising number: About 45% of the total 50% hazardous operations. **Thus, by combining hazardous and non-hazardous jobs, we find that lack of alertness and poor judgment account for 95% of the accidents.**

According to Corn Products Co., the basic safety problem does not lie primarily in the physical condition of today's modern factory, but in the mind of the worker—how he reacts to his fellow workers, to authority; how he sees himself in relation to things outside himself. Safety from a personal viewpoint is a continuous way of life.

Challenge to Industry

As CP sees it, the challenge to industry, in addition to providing and maintaining a safe place to work, accepting the responsibility for developing safe procedures and proper training of employees, becomes one of broader dimension. The significant task is to help the employee grow by affording him every possible assistance in attaining his maximum skill and at the same time helping him become a mature, responsible person. All phases of employee training should include these goals. The working climate in each department and each plant throughout the company should be conducive to this type of growth. Safety is a by-product of the overall company attitude and is only one of the many areas that will profit by a management philosophy which considers the individual growth of all of its employees. (End)

New Corn Products Policy Aims at 100% Control

	STEP 1	STEP 2	STEP 3
The Problem:	20% Hazards	30% Hazardous Jobs	50% on Non-hazardous Jobs
	← 100% of injuries →		
Prevention:	Eliminate	Std. Procedures and Training	Attitude of Safety Mindedness

	MANAGEMENT RESPONSIBILITIES	METHOD OF CONTROL	SUPERVISORS' DUTIES
STEP 1	▶**Provide** a safe place to work and **maintain** it in a safe condition.	—Engineering —Preventive Maintenance —Housekeeping	—Monthly Dept. Inspections
STEP 2	▶**Establish** and **enforce** safe operating procedures and rules. ▶**Provide** personal protective equipment. ▶**Train** and **motivate** employees to follow safe procedures.	—Job Analysis —Develop Safe Procedures —Training —Accountability	—Continuous Follow-Up of performances (Accountability) —Investigation of serious mistakes (Accidents)
STEP 3	▶**Develop** an attitude of safety mindedness among all employees.	—Interest in each employee as an individual. —Set an example. —Help employees develop skills —Listen to his suggestions and problems. —Adopt his suggestions that are practical. —Be for him.	—Talk to employees on an individual basis once a month about their safety and welfare.

Exhibit Features Latest in . . .

Bakers Show at Atlantic City accents automatic, high-speed operations

CAKE FILM WRAPPER handles 70 packages/min., accommodates nearly all films (with or without polymer coatings) in rolls on 3-in. cores. Unit wraps variety of card-supported items with tri-lock underfold.—Battle Creek Packaging Machines, Battle Creek, Mich. **(351)**

BREAD WRAPPER offers gentle, straight-line handling at speeds to 90/min. on 5½-in. loaves, 80/min. on 7-in. loaves. It handles 15-in. paper and 18-in. band rolls with new semi-automatic splicing feed device.—Package Machinery Co., E. Longmeadow, Mass. **(352)**

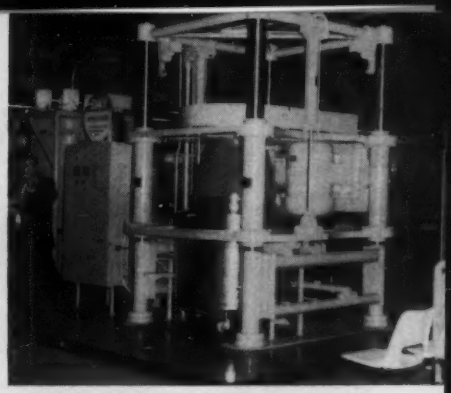
FILM BAG LOADER/SEALER turns out 40 packages/min. with one operator. Handles bags up to 11 x 13 in. in 1000 bag magazines. Latter provide 20 to 30-min. running time without reload.—Carbert Mfg. Co., Cambridge, Mass. **(353)**

5 Packaging Advances

BREAD BAGGER makes its own tight side weld poly bag from roll stock, inserts loaf, and recloses bag with reusable wire tie. Unit works "in line" with slicer at 60/min.—FMC Corp., Oakland, Calif. **(354)**

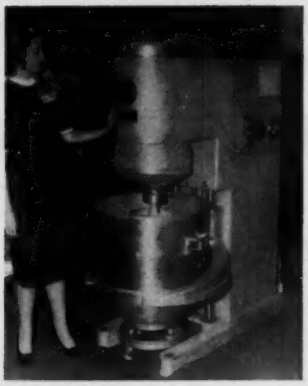
DUO-PACK UNIT accumulates two bread loaves, side by side, and applies thermoplastic label to package ends. Hooks up to any bread wrapper and includes accumulator, conveyor, and two end-labelers.—Package Machinery Co., E. Longmeadow, Mass. **(355)**

. . . Processing
. . . Packaging
. . . Handling

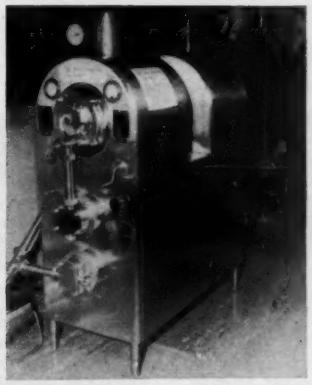


VERTICAL HIGH-SPEED mixer is key to integrated dough-development system that minimizes handling, mixing time. Features: Automatic ingredient loading, fermentation conveyor, and bowl hoist for dumping. Develops 5,500 lb. of white dough per hr. with remix, 7,000 lb./hr. of straight dough. —J. H. Day Co., Cincinnati. **(356)**

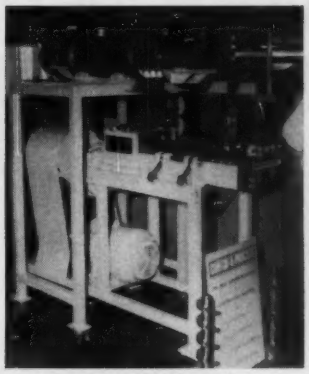
4 Efficient Mixers



PUSHBUTTON MIXER offers variable-speed control over 40-320 rpm. range. Merely pre-set desired mixing speed and push "start" button. Bowl capacities: 120, 160, and 340 qt.—American Machine & Foundry Co., N. Y. C. **(357)**

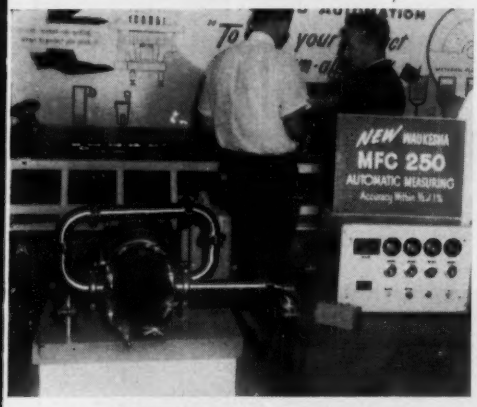


MULTI-PURPOSE unit mixes, whips, and chills—separately or simultaneously. Typical applications: Pie fillings, toppings, sauces, icings, and shortening.—Creamery Package Mfg. Co., Chicago. **(358)**

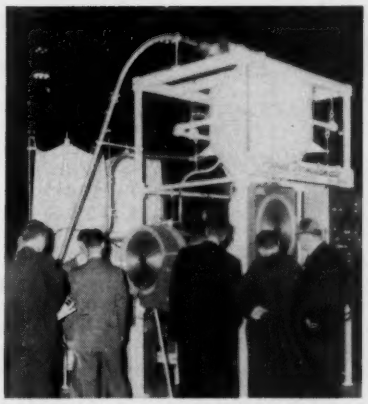


VERSATILE CONTINUOUS MIXER disperses shortening, pre-mixes doughs, mixes batters. Unit can be coupled to a kneader-developer or extruder to produce a wide variety of product forms.—Ambrette Machinery Corp., New York City. **(359)**

3 Process Controls



SANITARY PUMP simultaneously transfers and measures fluid or semi-fluid ingredients with accuracy of ½%. Positive-displacement unit handles 4-25 gpm. in a variety of pasteurization, filling, and mixing applications.—Waukesha Foundry, Waukesha, Wis. **(360)**



AUTOMATIC BATCHING system features pneumatic handling and central scaling. Any number of different dry and/or liquid ingredients can be formulated and delivered to any number of use points.—Fred D. Pfening Co., Columbus, Ohio. **(361)**

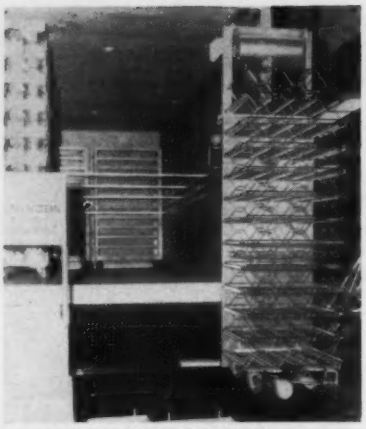
DUAL-INDICATING temperature and humidity controller for dough-proofing equipment offers 1½-deg. accuracy. Unit is adjustable from 70-140F. for humidity control, can be located up to 60 ft. from proofer.—Partlow Corp., New Hartford, N. Y. **(362)**

For more information, circle key numbers on Reader Inquiry Card, back of book

BAKERS SHOW

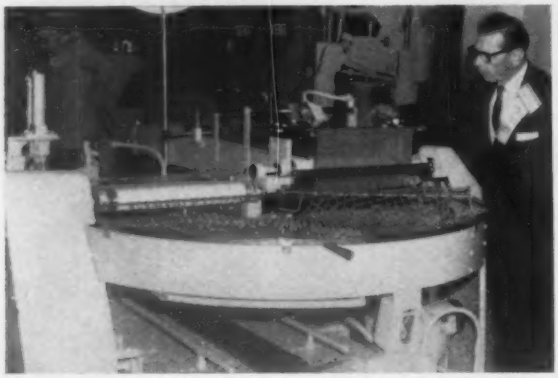
(Continued)

TRAVELING GATE GROUPER prevents inertia shock to proofed bread which goes from proofer to oven without stopping. Gently handles any production up to 12,000 loaves/hr.—Read Standard, York, Pa. **(363)**

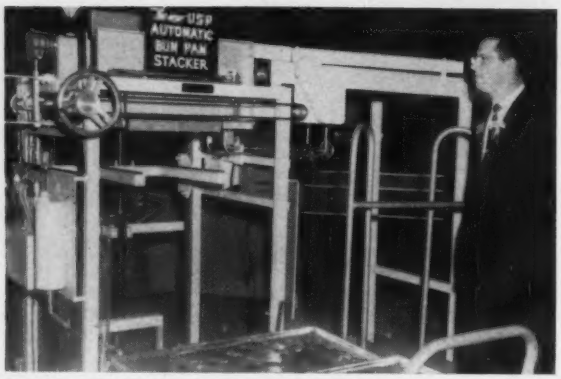


LOADING/UNLOADING RACKS permit rapid handling in trucks and trailers. Racks swing around and are lowered to ground by power operated device; folds flat against inside wall when not in use.—Nestaway Inc., Cleveland. **(364)**

4 Materials Handlers



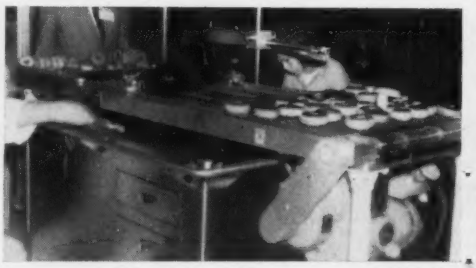
TWISTER-PANNER attaches to any existing moulder for a fully automated twisted-bread line. Compact unit has infeed conveyor with adjustable loaf guides, 180-deg. twister and automatic panner.—J. H. Day Co., Cincinnati. **(365)**



PAN STACKER handles all bun or tray-type pans, deposits the stack on a truck, and discharges the fully loaded truck. Floor space required is 38x38 in.—Union Steel Products Co., Albion, Mich. **(366)**

3 Processing Units

CONTINUOUS PROOFER (running rack) permits smoother product handling without stopping for load-unload. Has variable-speed drive, oscillating conveyors, and less parts for less maintenance.—Read Standard, York, Pa. **(367)**

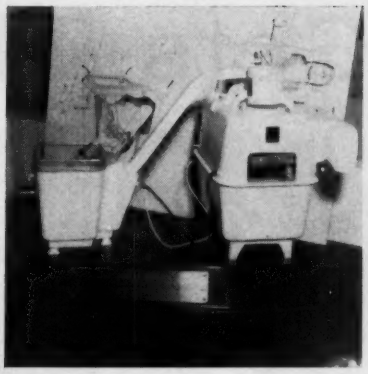


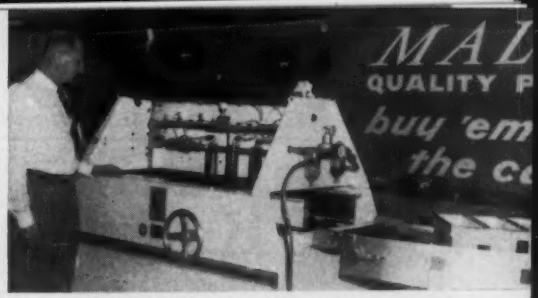
STAINLESS-STEEL ICING machine has double-jacketed heating tank with thermostatically controlled immersion heaters. Tank capacity is 175 lb., conveyor is optional.—Basic Foods Sales Corp., Englewood, N. J. **(368)**

ELECTRIC BAND OVEN, fully automatic, has 10-ft. long baking chamber for baking soft, shortbread type cookie doughs at rate of 80-150 lb./hr. Depositor's rotating die allows unlimited variety of shapes.—Werner Machinery, Grand Rapids, Mich. **(369)**

Auxiliary Equipment

FRUIT WASHER (model) consists of a breaker unit, and washing, extracting, spin-drying unit—has outer casings of glass fibre reinforced polyester resin. In operation, it breaks down solid fruit mass to ensure maximum foreign matter extraction. — John Collins Ltd., Bucks, England. **(370)**





MULTI-PAN GREASER automatically greases full set of pans with every stroke—3-, 4- or 5-pan straps. Individual spinning discs apply oil simultaneously inside each pan for maximum coverage.—Mallet & Co., Carnegie, Pa. **(371)**

STEAM GENERATOR has five boiler hp. capacity and yet takes up only 30- to 40-in. of space—saves fuel by operating only when steam is needed. Also boasts low 2- to 3-min. heat-up time. — Malsbury Mfg. Co., Oakland, Calif. **(372)**

STARCH DUSTER pneumatically dusts dough under vacuum and keeps starch powder completely confined within itself. Unit reduces proofer cleanup by 75%, avoids stickups and delays.—Nat'l Starch & Chemical Corp., NYC. **(373)**

8 Other Ways To Improve Processing

★ **BRITISH CONTINUOUS BREAD-DOUGH** system will be adapted to American-style breads. Ingredients (including pre-ferment solution) are automatically metered into jacketed mixing cylinder. Mixer is an eccentric worm with roller along periphery of spiral, and a rod inside the spiral. Bars near discharge end of worm develop dough. Capacity: 4,500-5,000 lb./hr. of cookie dough, 4,500 lb./hr. of bread dough.—Baker Perkins Inc., Saginaw, Mich. **(374)**

★ **SMALL-PACKAGE CHECKWEIGHER** handles 80 items/min. in 2-50 oz. range. Accuracy is ±1/32 oz., over- and underweights are automatically rejected.—Toledo Scale, Toledo, Ohio. **(375)**

★ **DIVERTER VALVE** for pneumatic-handling systems has thumb lock to prevent accidental operation from either operating position. Aluminum unit is operated by manual hand lever.—Superior Separator Co., Hopkins, Minn. **(376)**

★ **AUTOMATIC BUN DEPANNER** handles 5,000 dozen /hr. of hot or cold buns. It de-pans all types of hamburg and wiener rolls, singly or in clusters.—Alto Corp., York, Pa. **(378)**

★ **CONVEYOR BELTING** of Mylar and vinyl offers built-in tracking arrangement to hold belt alignment on long or short runs. This curbs side-slipping and resultant frayed edges.—Voss Belting & Specialty Co., Chicago. **(377)**

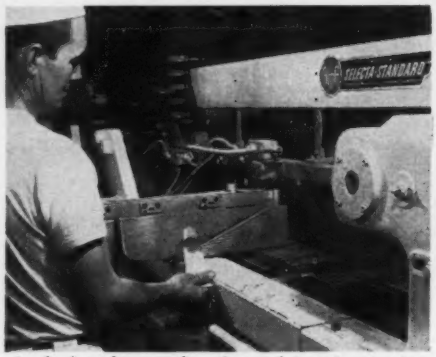
★ **INFRA-RED BUN & BREAD WRAPPER** uses poly films, Pliofilm, cellophane, and wax paper; handles 75 loaves and 55 roll packages/min. Separate bottom and folder heating controls provide required sealing temperature for each wrapping material.—American Machine & Foundry Co., New York City. **(379)**

★ **FORMER AND PANNER** for cinnamon buns and sweet rolls combines dividing, resting, sheeting, make-up, and panning in one automatic step. It produces up to three varieties of filled products in one package —1,200/hr. of 9 rolls each, 1,800/hr. of 6-roll packages.—DCA Food Industries Inc., New York City. **(380)**

★ **CONTINUOUS DOUGH MAKER** produces 1,200-3,600 lb./hr. in 20x25-ft. area. Dough is mixed, developed, and divided in 3 min. System features automatic ingredient feed, simplified control, and sanitation.—Baker Process Co., Belleville, N. J. **(381)**

Sticking Gets The Slip

Applied to milk evaporators, preheater tubes and plug valves, SLIPICONE aids sanitation . . . facilitates removal of milk splatter . . . prevents trouble caused by sticking parts.



Applied to heat sealing bars of bread wrapping machine, SLIPICONE increases heat-transmission and film-sealing speed . . . prevents sticking and tearing, browning and ink smear.

SLIPICONE Keeps Equipment Clean For Peak Efficiency

Got a sticking problem? Solve it with SLIPICONE®, the Dow Corning *silicone release agent.* SLIPICONE puts a slick, stick-free surface wherever you want one . . . prevents adhesives, packaging materials and products from sticking to (or piling up on) any surface. Thus, SLIPICONE speeds operations, reduces waste, keeps packages clean . . . *saves money!*

Safe—Heat Stable. Nontoxic SLIPICONE is safe to use in contact with fresh, frozen or baked foods*. Temperature extremes have little or no effect on SLIPICONE . . . it stays on the job — prevents sticking — from 40° below zero to 400° F.

Easy does it! A thin coating of SLIPICONE is all it takes. Simply spray or wipe it on any surface as needed. Get SLIPICONE from your paper wholesaler or packaging materials supplier.

SLIPICONE comes in 2 oz. tube, 8 oz. tube, and 12 oz. aerosol . . . to wipe or spray sticking problems away!

*Write Dow Corning, Dept. 4723a, for complete data on use of Slipicone in the food processing industry.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

Tips to Management

Business ground rules

. . . Foreign base value

. . . Trouble for Hoffa

Fair Play for Business, Too

While no business should ever object to investigation and disclosure, ground rules should be clearly and precisely stated so that they may serve as guides to the businessman. So said Campbell Soup Pres. W. B. Murphy in a recent address at Creighton University, Omaha.

He emphasized that "some ground rules are necessary in our economic system, rules that apply not only to business, but to labor organizations and all private institutions." In what might be considered a needed public relations theme for today's business, the Campbell chief executive added that such rules must be "based on the American tradition of jurisprudence and fair play—written with the presumption that business practices are ethical until proved otherwise and not with the presumption that business is guilty until proved innocent."

He concluded that the best way for business to stop the flow toward greater government regulation "is to not provide the excuses or reasons that bring more control."

Foreign Subsidiaries—A Good Bet

Approximately one in three U. S. manufacturing companies engaged in foreign operations last year was utilizing a foreign-base subsidiary, according to a recent National Industrial Conference Board Survey of 350 companies.

Reasons, in addition to anticipated tax benefits, included:

► **More autonomy and independence for international operations.**

► **Better integration of overseas expansion and development.**

► **Closer proximity of management and sales personnel to foreign markets.**

► **A spreading of financial and political risks.**

Operating and management gains were reported by most respondents. And a two to one opinion showed that adjustments in administrative and marketing techniques have not complicated the foreign operations nor significantly offset the tax-deferral benefits obtained.

More Troubles for Jimmie

Jimmie Hoffa, presently responsible for the fate of many of the people transporting food products around the country, is making more and more headlines. In general, they've been bad—for Jimmie Hoffa.

For instance, the AFL-CIO Executive Council voted 24-2 against readmitting the Teamsters to the Federation. Council voted to take back any locals that break with Hoffa and claimed that some 100 defecting Teamster groups have applied for affiliation. A Federation truck driver union, however, was deterred by the opposition of Walter Reuther who does not appear to want a showdown fight with Hoffa at this time.

The government also stepped back into Hoffa's life by re-indicting the Teamster boss on fraud charges involving misuse of more than $500,000 in union funds in a Florida land venture. And the Senate Internal Security subcommittee hauled Hoffa in to learn more about his "mutual assistance pacts" with Harry Bridges International Longshoremen and Warehousemen and the Mine, Mill and Smelter Workers, both of which are generally regarded to be Communist-dominated.

Legislatively, Sen. John McClellan (D-Ark.), has a bill ready for Congress that is directly aimed at Hoffa and transportation unions. It would place "certain labor unions in the transportation industry under regulations similar to those placed on business and industry by antitrust laws." The Senator told the Bakers Convention in Atlantic City that, "While Hoffa has said that he would not call a nation-wide transportation strike, I'd rather have a law saying he can't to it, rather than just his mere word."

All in all, it's been a defensive month for the Teamster chief, who's big plans for organizing (FE Oct., p.49) may be in for a few crimps.

End for Mexican Migratory Labor?

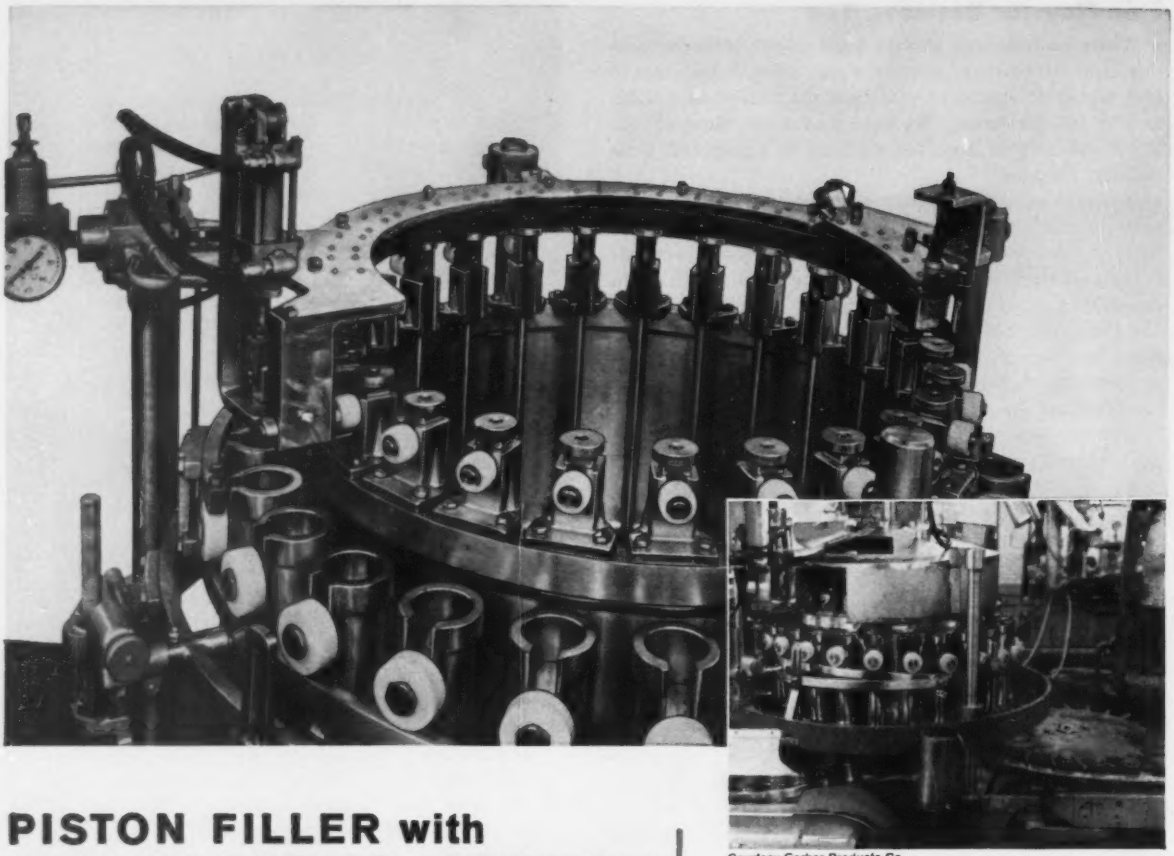
Farm labor problems of tomorrow will be solved less and less through the use of Mexican farm workers. At least, that's the opinion of R. C. Goodwin, Dir. of the Bureau of Employment Security of the U. S. Dept. of Labor.

In an address before New Mexico employment personnel, he made these points regarding future labor trends:

► **It is going to be increasingly necessary** to develop adequate plans for recruiting more qualified domestic workers who can handle the complicated machinery and techniques coming into far greater use.

► **Effective training programs** must be initiated so that more local people will be able to perform year-around tasks on tomorrow's farms, especially large corporate and highly mechanized farms.

► **Improvements in wages and working conditions** will be necessary in certain areas before domestic workers can be recruited successfully.



Courtesy Gerber Products Co.

PISTON FILLER with NEW MAGNETIC MONITOR*

prevents valve damage and costly down-time

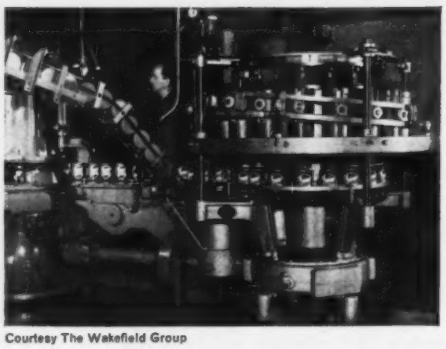
The Magnetic Monitor on VOTATOR piston fillers consists of a combination of indestructible permanent magnets and the pneumatic lift for positioning the valves. This assembly, with only two moving sections, provides:

a. Positive no-can, no-fill operation.
b. The elimination of *every* possibility of a valve jam due to foreign material in the product or the malfunction of any associated equipment.
c. A completely smooth valve action to eliminate all splashing of product.

This is another VOTATOR piston filler *first* that warrants your immediate interest. You will quickly recognize the advantages and important savings it offers. Write *today* for Bulletin PED274 Girdler Process Equipment Division, Chemetron Corporation. Louisville 1, Kentucky. Sales Offices: Chicago; Louisville; Marietta, Ga.; Montclair, N. J.; San Francisco.

*Trademark, Patent applied for

New, higher standards of packaging economy are being realized by processors of a wide variety of products. VOTATOR Piston Fillers give close-tolerance filling of liquids and viscous materials at remarkable speeds. No-container-no-fill controls safeguard against interruption of operation and waste. And, new "Magnetic Monitor" prevents costly damage and downtime.



Courtesy The Wakefield Group

Votator
Trademark

a Product of CHEMETRON Corporation

KEY to efficient operation is this new Bagmaster that makes bag, conveys and weighs product en route, pours product into bag, seals it, and conveys finished package to packing cases.

Better Performance Through . . .

Automated Coconut Packaging

Single unit has upped firm's production, improved its product, and lowered costs in a sanitary operation that boasts flexibility

AFTER A YEAR'S OPERATION of their new coconut packaging line, Griffin Mfg. Co. adds up tremendous benefits from the change in systems.

Firm packages four times as fast as before, with fewer people. On the old manual and semi-automatic line Griffin used 12 to 15 employees. They now use four.

On the automated line, because coconut is untouched by human hands, firm offers not only a more sanitary product, but also a more uniform one. Because the coconut is exposed to air for a much shorter period of time, a fresher product is obtained.

Two shifts are run during peak months of fall, with September through February the biggest season. Naturally during the summer months less coconut is produced. All coconut produced in warm months is kept in cold storage to maintain its freshness. New packaging system is an aid to this flexibility of operation.

Packaging line is built around a unique automated packaging unit (Wright Bagmaster) and its allied equipment. It was installed by Wright Machinery Co., Div. of Sperry Rand Corp., after more than three years of R&D by their engineers.

Start to Finish System

Formerly Griffin's operation was manual; other than the coconut was semi-automatically weighed into ready-made bags. Briefly stated, the new unit makes the bag, conveys coconut to the bag, weighs the product, pours coconut into the bag, seals it, and conveys the bags to packing cases.

Coconut is received on direct import from the Philippine Is. Product has been desiccated and pressed into 100-lb., triple-walled, parchment-lined bags. It is then run through a special machine which was designed and built by Griffin's Engineering Dept. Machine separates the shreds so they can be processed properly by one man who weighs the coconut and places it in stainless steel revolving pans, while another checks the operation of the Procter & Schwartz Dryer where coconut is dried in the proper moisture content. Processed coconut then

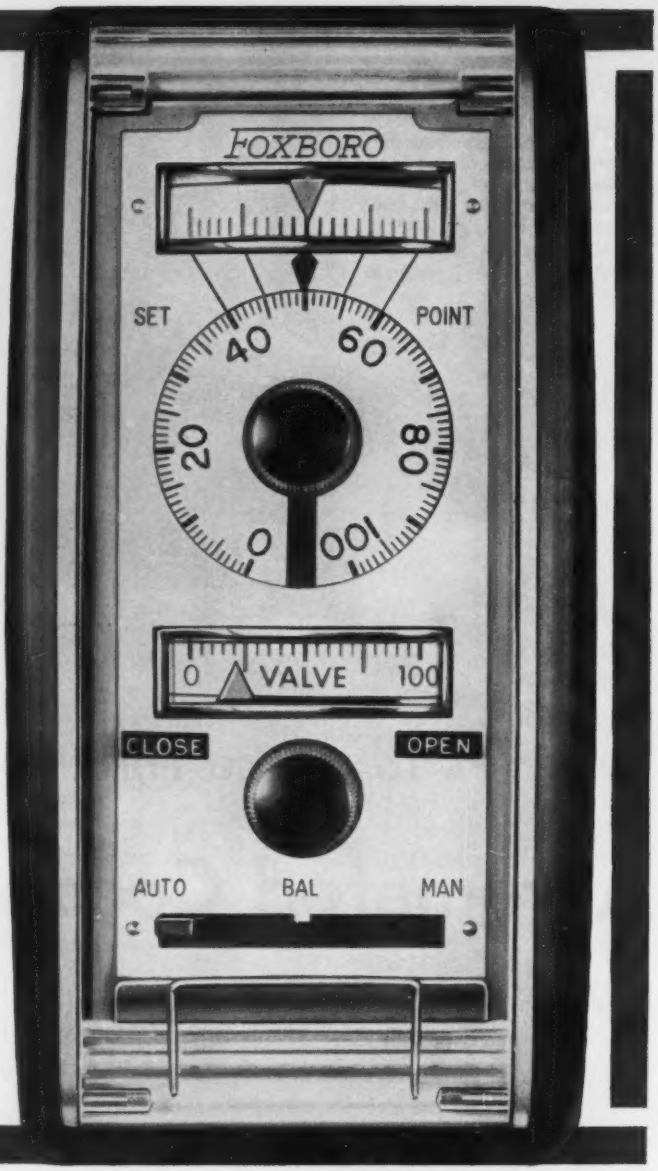
RAY E. ASHLEY,
Supt. of Manufacturing, Griffin Mfg. Co., Muskogee, Okla.

Measurement deviation...

plus indication...

plus valve position...

you get them all with this **Foxboro electronic control station**



Shown here actual size →

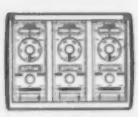
One 3″ x 6″ panel station containing all control and supervisory functions — that's the Foxboro Electronic Consotrol* Controller. All d-c input — all d-c output — all solid state. Operates completely independent from recording.

And look at these other features:

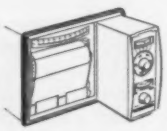
- measurement and deviation indicator gives continuous indication of process measurement as well as showing the deviation from set point.
- calibrated set point dial, with 4¾″ scale, used with deviation indicator for readability of ½% full scale.
- valve position indicator for continuous, horizontal-scale indication of valve opening.
- simple auto-manual transfer switch for smooth, bumpless transfer.

Foxboro electronic Consotrol control stations are available for cascade, ratio and auto-selector systems. Ask your Foxboro Field Engineer about them — or write for Bulletin 21-10. The Foxboro Company, 3011 Neponset Avenue, Foxboro, Massachusetts.

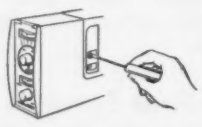
Reg. U. S. Pat. Off.



Standard 9″ x 6″ housing holds 3 control stations, or 1 station with a companion recorder.



Controller and recorder each slide out from panel for easy servicing.



Proportional — reset — derivative: all adjusted from the front.

FOXBORO
REG. U. S. PAT. OFF.

comes from the dryer, to a conveyor, to a spreader machine (Wright Special Flo Hopper & Incline). This specially designed spreader machine blows the coconut to constant level depth on an incline conveyor, which carries the product to top of the Bagmaster unit.

Two men are involved with coconut processing, and four on the packaging unit. One operator controls the coconut from dryer to spreader, one monitors the Bagmaster, and two girls work at the packing area.

Automatic Weighing

Coconut is transferred to the conveyor into a surge hopper, and then into vibrator feed troughs, and finally to the scale where it is weighed automatically. Product is dropped into duplex bags formed from two rolls of cellophane—one plain, and the other printed. An electric eye controls alignment of printed matter without variation. A thermostatically controlled heat seal is applied to the seam of the bag, and bottom of the bag is sealed by closing jaws before the coconut is dropped into it. As the coconut drops, jaws agitate the bag to settle product and avoid overflow. Bag then drops. As it does so, rollers squeeze out trapped air in pillow-type package before top is sealed and cut. As bag completes its drop, jaws close heat seal and clip the bag in the same manner as the bottom.

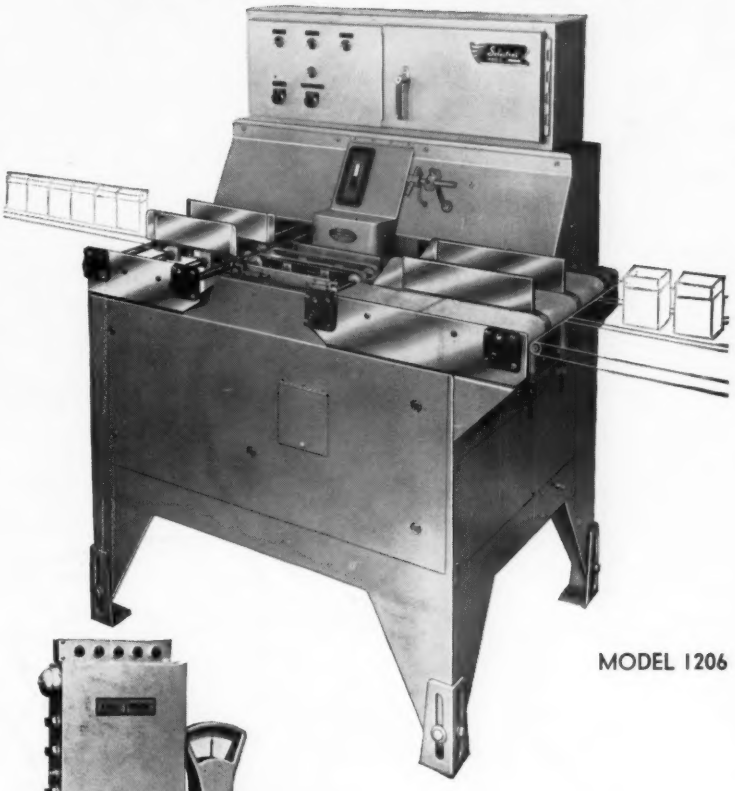
Bag then drops on the conveyor which carries it to packing table. Two girls make spot checks at intervals on an Exact Weight Scale to be sure humidity or other conditions have not caused weight variation. Correction, rarely needed, is simple and quick. Girls place bags in cases waiting on pallet where they are picked up by fork-lift trucks.

Muskogee, Okla. firm packages coconut in 3½-oz., 4-oz., 7-oz., 8-oz., and 14-oz. 1# double-wall cellophane bags. This material proves best for machine's operation as well as the display and shelf quality.

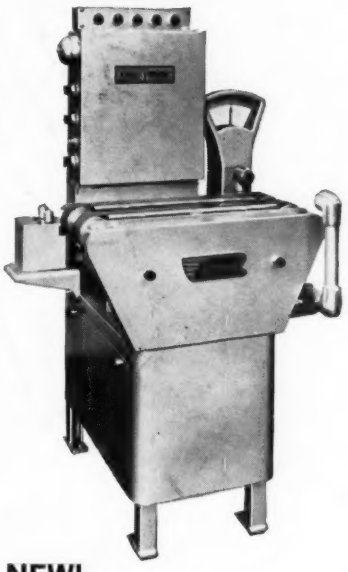
To change from one bag size to another requires but a few minutes to put on different size hopper, correct size of cellophane rolls, dial adjustment for speed, and one-knob weight change.

Bagmaster turns out 3½-oz., and 4-oz. bags at 30 to 33/min. rate, 7-oz. and 8-oz. bags at 25 to 28/min., and 14-oz. and 1-lb. bags at 18 to 23/min. (End)

SELECTROL® Automatic CHECKWEIGHERS



MODEL 1206



NEW!

Model 1248 Selectrol weighs cases and cartons from 10 to 50 lbs. at speeds up to 40 units per minute. Accuracy is 1/10 of one percent or better. Write for details.

Selectrol weighs in motion eliminates spot checking

Selectrol Model 1206 automatically weighs, classifies and sorts packages to 5 lbs. at speeds up to 120 units per minute, depending on weight and size of object. Rejection accuracy is 2/10 of one percent of the commodity weight at maximum speed. Tolerance limits are adjustable.

With a constant speed, no stop motion, Selectrol segregates each package according to predetermined tolerances for overweights and underweights. Signal lights and counters are available as optional equipment.

Selectrols are made by Exact Weight, a leading manufacturer of industrial scales for more than 45 years with experience gained through hundreds of checkweighing installations. For complete details on Model 1206, write for Bulletin 3377.

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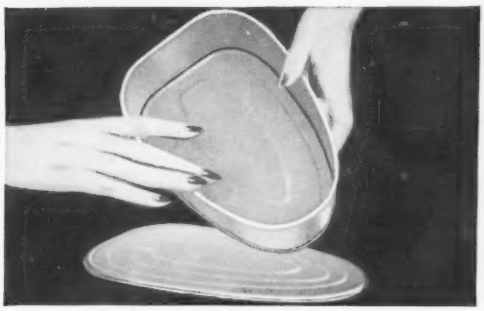
CIRCLE 53 ON INQUIRY CARD

CIRCLE 55 ON INQUIRY CARD →

The Perfect Container doesn't Just Happen!

WISE Armadillos seldom lose out on the field of battle. They just pick smaller opponents! And, when the odds are against them—they rely on the "suit of armor" nature thoughtfully provided. Another case of a container—that does what it's supposed to do . . . best!



New design . . . with convenience in mind!

Canco's new "MiraGuard Safety Rim"* ham can is an excellent example of a container that does what it's supposed to do . . . best! It features a safe rolled edge . . . makes raw-edged cans obsolete. Even a child can handle this new can safely!

Easier to open, too!

The "MiraGuard Safety Rim" ham can has a tear strip that winds smoothly because it is self-tracking. Canco has even redesigned the winding key. Now it is shaped to fit a woman's hand for easier roll opening.

To help boost your sales and profits, put Canco's aggressive team of research, manufacturing and marketing experts to work for your products.

*Trademark—American Can Co.

GREAT CONTAINER IDEAS COME FROM CANCO

CANCO DIVISION

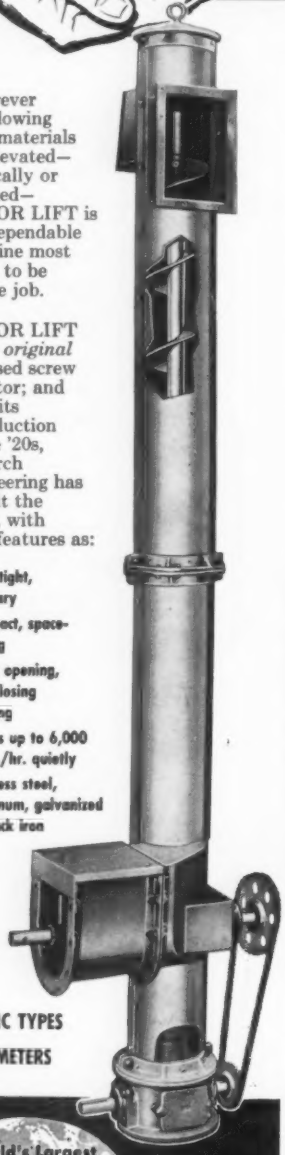
AMERICAN CAN COMPANY

Rotor Lift
–GOOD RIGHT HAND OF THE PROCESS INDUSTRIES!

Wherever free-flowing bulk materials are elevated—vertically or inclined—ROTOR LIFT is the dependable machine most likely to be on the job.

ROTOR LIFT is the *original* enclosed screw elevator; and since its introduction in the '20s, research engineering has kept it the *finest*, with such features as:

- Dust-tight, sanitary
- Compact, space-saving
- Quick opening, fast closing housing
- Moves up to 6,000 cu. ft./hr. quietly
- Stainless steel, aluminum, galvanized or black iron



8 BASIC TYPES
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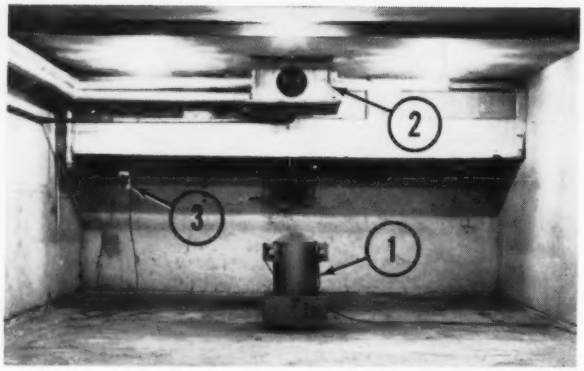

MATURING UNIT (1) located directly under ceiling fan (2) is automatically controlled by thermostat (3) in unique cooling room designed for maximum maturation efficiency.

Pear Maturation Improved

Combination pre-cooling/cold-storage room slashes 50% off handling costs with better product quality

PEAR MATURATION, previously considered a difficult and inaccurate process, has been greatly improved through use of newly designed cold storage rooms. The rooms, developed by G. A. H. Wehrmann, former plant manager of Tulbagh Fruit Industry Ltd., Union of S. Africa, offer a maturing time that can be determined in line with production requirements (average of seven days.)

Couple this with: A reduction of 50% in handling costs; an absolute evenness of maturity grade (making sorting unnecessary); a minimum of rotting losses; and elimination of "wind-stacking." These are just a few advantages, not to mention savings in reduced working hours due to better condition of the fruit.

Basically, the cold storage rooms, key to this completely controlled process, are designed so each is reached by insulated pre-cooling ducts. Dampers for suction and pressure in each room permit fine regulation of desired flow of pre-cooling air. For holding room temperature, two ceiling units with fan and brine parcels are installed. This eliminates former method of transporting pears into pre-cooling tunnel and further transport of pre-cooled fruit into cold-storage room.

A central switch board permits each room to be designated "warm" or "cold" with the flick of a switch. In effect, to minimize human errors, when switch is in "cold" position, both ceiling units and brine-pumps are in circuit and controlled by the coldroom thermostat.

When switch is in "warm" position, ceiling units by-passing the thermostat are running permanently while brine-pump is blocked out of circuit. Ceiling units act as fans for circulation. At the same time, two plugs for 380v, three-phase/room, are brought into circuit, thus allowing maturing units to operate. This circuit, however, is disconnected by the flick of a switch to "cold," thus avoiding erroneously heating coldrooms.

Two maturing units (10kw heating capacity) per room (containing 60 tons of fruit) are positioned under center of the ceiling units where their air currents are adjusted into the longitudinal axis of the room. Louvers are set at 45-deg. downward. Thermostats are hung in diagonally opposite corners of the room.

Ceiling fans direct air-currents onto the center point of the room, and one side of the maturing room does the same. The second side of maturing units blow against short side of the room and result in a "whirled-about" air sucked in again by the ceiling fans. An absolute warming of the room and its contents is reached. Temperature readings taken on the floor and under the ceiling do not vary more than ½ deg. F.

Former transporting of pears into maturing rooms for "wind-stacking," plus the sorting of fruit to extract ripe units for the cannery and re-packing hard units in "set-backs," is unnecessary. And since the fruit is not handled at all, the risk of rotting is avoided.

(End)

CIRCLE 56 ON INQUIRY CARD

CIRCLE 57 ON INQUIRY CARD →

What can lemon juice do for mayonnaise?

Exchange Lemon Juice, blended with vinegar, produces higher active acidity in the water phase (and lower in the oil phase) without excessive acid odor. It extends shelf life by improving emulsion stability and reducing tendency to go rancid. Constituents in lemon juice will tie up metallic ions (such as copper and iron) which attack fatty oils of the emulsion.

...for barbecued beans?

Lemon juice enhances flavor. Used in the barbecue sauce, it is most effective in adjusting acidity. The true taste of the beans is heightened. And, of course, the addition of lemon juice adds a saleable distinction to your label.

...for your product?

Send us the coupon today—and let our researchers tell you what lemon juice can do for you.

Sunkist Growers

Products Sales Dept., 720 E. Sunkist St., Ontario, Calif.

GENTLEMEN: *Our product is* _____

_____ *How can lemon juice help?*

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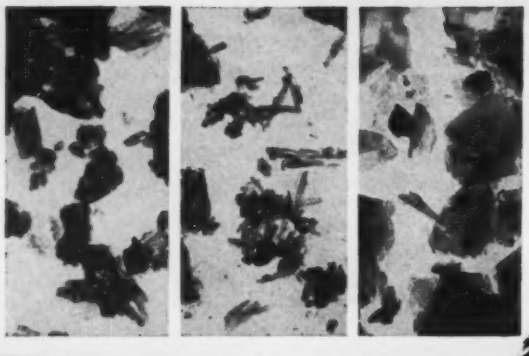
Exchange

Electron micrographs of Micro-Cel A, C and E show particle structures ideal for food applications.

1μ



Micro-Cel helps keep food mixes bone dry!

Micro-Cel®, Johns-Manville's new synthetic calcium silicates, answers caking problems. Highly absorbent, it remains a free-flowing powder after absorbing triple its weight. High bulk (4½ lbs. to a cu. ft.), irregular particle shape and high surface area, make it ideal for coating sticky and hygroscopic particles. Micro-Cel gives low cost per pound-volume. To keep food mixes free-flowing, even under the worst conditions, try Micro-Cel. For information, samples and assistance, mail coupon below!

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☐ Please send additional data.

☐ Please send free sample of suitable grade of Micro-Cel for use in:_____

☐ Have local Sales Engineer contact me.

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Company_____

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City_____ Zone____ County_____ State____

Celite Division synthetic silicates used as anti-caking agents up to 2% are not considered food additives as defined by FD&C Act Amended, Section 201(s).

Preparing the New Employee

Here's a checklist for giving your new employees a good start. Knowledge can help lower turnover, reduce training time, and speed up productivity, performance, and efficiency

HOW YOU HANDLE a new employee during his first few days on the job often determines what kind of worker he will be later on. A good orientation program can serve to reduce early personnel turnover, costly job errors, and the time required to have an employee reach satisfactory performance levels.

Much of any program is implemented by a personnel department. Aside from insuring sound hiring procedures, this division might also explain:

1. Company history. Describe firm's aims, place in the industry, number of employees, organization, names of key people, layout, personnel office's function, and sources of company information.

2. Conditions of employment. Explain how new employees are hired and assigned to jobs, pay classifications, deductions, paydays, hours of work, vacations and holidays, performance rating methods, behavior expected, training methods, promotion opportunities, and miscellaneous procedures.

3. Employee relations, Describe health and first-aid facilities, hospitalization and insurance plans, personal services, grievance procedures, recreational activities, and company publications.

4. Job/work environment. Explain how employee's department functions, how it fits into the company organization, his job description, nature of supervision, learning and reference aids, company rules, and special facilities.

Actually, the real key to successful employee performance is a competent supervisor. On-the-job training will only be as valuable and worthwhile as is the ability of your supervisor to pass on knowledge and skills to the new employee.

While written instructions about duties and performance standards will help the employee understand the job, the supervisor must still explain job details, answer questions, and continue instructions as the new employee moves ahead. Checklist at the right provides an outline for supervisors to follow in welcoming and systematically inducting new employees.

Problem of finding competent workers is by no means a new one. How you solve this problem depends on you. But there is no reason for not having good workers if you have a sound orientation program. You'll probably end up with less turnover, better efficiency, and more loyal workers. (End)

ROBLEY D. STEVENS
Management Consultant, Washington, D.C.

Supervisor's Checklist for New Employees

The induction period is your greatest opportunity to win a new employee's loyalty, stimulate his interest, and get him started on the way to profitable job performance. After the orientation period, check (✓) each question listed below to be sure you have welcomed him properly and given him all essential information:

Name: .....Date hired: .....

Job title: .....Pay grade: .....

Department: .....Supervisor: .....

DID YOU . . .

1. Get ready to receive your new employee?
- ( ) Review his work experience, education, and training?
- ( ) Have up-to-date description of his job or a list of his job duties and responsibilities?
- ( ) Have his workplace, tools, and supplies ready for use?

2. Welcome him properly?
- ( ) Put him at ease?
- ( ) Indicate his relationship to other employees?

3. Show him genuine interest?
- ( ) Discuss his background and interests?
- ( ) Inquire briefly about his home life?
- ( ) Inquire about his transportation to and from work?
- ( ) Inquire about special problems of his job?

4. Explain the work of your department?
- ( ) Outline your department functions?
- ( ) Specify his job?
- ( ) Explain briefly relation of his work with that of other employees?
- ( ) Tell him to whom he reports?
- ( ) Show him the exact way his job should be done?

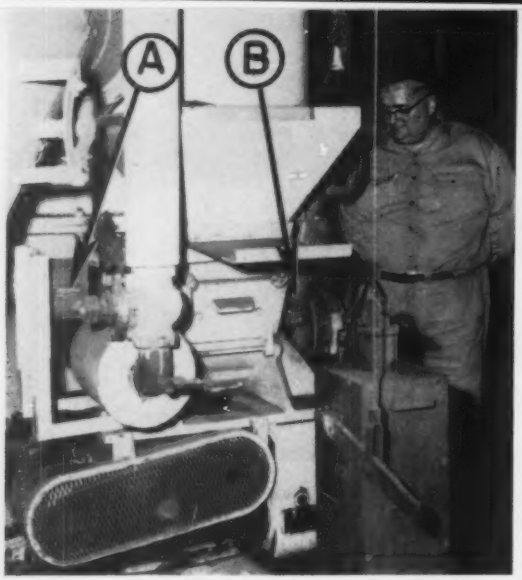
5. Show him the layout and available facilities?
- ( ) Show him the physical layout of your department?
- ( ) Show him the washroom and available facilities?

6. Introduce him to co-workers?
- ( ) Explain briefly duties of each co-worker to whom introduced?
- ( ) Arrange for a co-worker to lunch with him on the first day?

7. Explain company rules?
- ( ) Inform him of hours of work?
- ( ) Explain necessity of punctuality and good attendance?
- ( ) Let him know times of rest periods and lunch breaks?
- ( ) Explain use of telephone during working hours?
- ( ) Describe vacation plans, holidays, and incentives?
- ( ) Tell him about company policy on work performance?

8. Instruct him properly?
- ( ) Give step-by-step instruction on the first day?
- ( ) Explain quality and quantity work standards?
- ( ) Assign a workplace?
- ( ) Stress safe working habits?
- ( ) Explain use of company equipment?
- ( ) Explain purpose of effective discipline on the job?

9. Follow up?
- ( ) Check frequently for proper job performance?
- ( ) Correct him when necessary in private?
- ( ) Encourage questions about his job?



MAXIMUM POWER EFFICIENCY is assured for coal-feeding system equipped with isotope source (A) and Geiger detector (B). At American Maize Products Co.'s starch and corn syrup refinery, level control assembly provides uniform coal flow and keeps boiler at top capacity.

Isotope Detectors Assure Efficient Level Control

Difficult flow-control problems are solved as meat, fudge, and even coal handling systems incorporate modern isotope level detector assemblies

RADIOISOTOPE level controls are fast bringing a new era in food production and processing technology. Several new industry applications utilizing isotope gage-control systems have been developed and one may very well be the solution to your regulating problem.

For instance, a West Coast confectioner is using an AccuRay continuous isotope level-measuring system to detect fudge thickness —when product exceeds or falls below desired target level.

Source is beamed across a continuous belt onto which liquid fudge is poured, formed, and cooled. System provides a continuous readout that indicates when feed onto belt should be manually adjusted. Company now plans to install an automatic control system that will employ a signal supplied by the level detector to control feed.

In the Midwest, a large meat packer has installed an isotope level detecting-control system on emulsifier hoppers.

FE Staff

During the conventional sausage emulsion-preparation, meat is first conveyed to a grinder. Ground meat then drops from a conveyor into the hopper. Hoppers are small, generally 16 in. deep with 22-in. top and 13-in. bottom diameters.

Dual-problem was to feed this small-capacity hopper from a high-speed grinder and protect emulsifier grinding mechanism from damage when hopper runs dry.

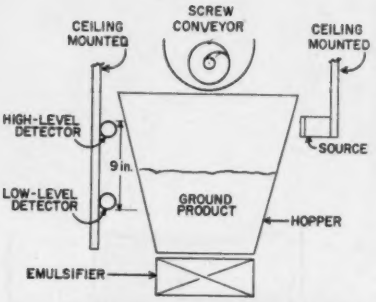
Set Limit Levels

Solution was to create an upper level limit to prevent meat overflowing from hopper and a lower limit to protect emulsifier from running without product. This has been achieved through installation of a single radioisotope source and two complete detectors (See diagram). Both source and detector units are ceiling-suspended so that no part of the level system must be removed while taking emulsifier hopper apart for cleaning.

Bottom detector is wired for fail-safe in low-level direction. It's used to stop emulsifier when supply of chopped meat falls to bottom of hopper and start operation when fill again rises. Mechanism automatically starts emulsifier at beginning of a batch and stops it when meat runs out. Top detector is also wired fail-safe but in the high-level direction. It start-stops screw conveyor transferring meat to top of emulsifier's hopper.

When chopped meat reaches top of hopper, it energizes a level switch which closes a contact and pulls in a secondary time-delay relay. Relay can be preset to allow level within hopper to drop about 50% before screw conveyor restarts. Unit also reduces the number of times conveyor must start-stop, making operation smoother with less strain on equipment. Also incorporated into the circuit is a manual-automatic switch enabling operator to take over in an emergency.

System's cost is justified to some extent by a reduction in manpower requirements. Need for an operator to watch hopper to manually control conveyor and emulsifier is eliminated. Whenever a batch of meat is processed,



HIGH-LOW LIMIT DETECTORS automatically maintain safe levels of ground meat flowing from screw conveyor through hopper to emulsifier. As product fill supply shifts, bottom detector starts-stops emulsifier and upper detector controls screw conveyor.

level switches automatically control screw conveyor and emulsifier. As a result, packer is now processing more batches of meat per day with the same personnel.

Coal Flow Control

Radioisotope systems have also been utilized for other than processing problem-solving as illustrated by American Maize Products Co. Firm's Roby, Ind., starch and corn syrup refinery was having trouble with its boiler coal-dust feeding system. Coal flow often bridged, boiler capacity dropped to one-half, and boiler fire would go out.

After a year of experimenting with a variety of detector systems, solution was found in a radioisotope type of level detector that now assures minimum maintenance and reliable operation.

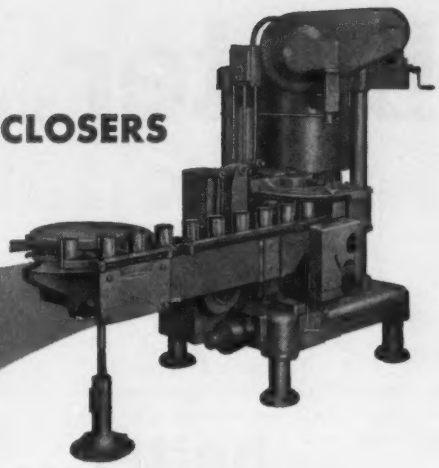
Detector consists of a double hermetically sealed radioisotope and Geiger tube detector, both externally mounted to coal-feed pipe. Units are mounted diametrically.

Maintenance is not complicated by any contact between system's components and coal within the pipe. Components are weather- and explosion-proof.

When level of coal within pipe interrupts source-detector energy relationship, detector provides signals that actuate visible and audible alarms. Operator immediately corrects improper feed.

Coal-feeding system is hooked up to a new gas and oil-fired boiler that generates 125,000 lb./hr. of steam and operates under a pressure of 900 psi. Coal is gravity-fed from overhead bunkers through a pipe and pulverizer and then into boiler's burner section. (End)

ANGELUS CAN CLOSERS



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COL-FLO® stabilizer for frozen fruit pie fillings. Safeguards and improves stability with far greater resistance to freeze-thaw breakdown than other types of thickeners. Doesn't cloud natural colors. Never interferes with natural food flavors.

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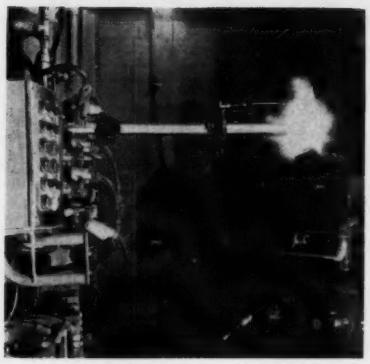
Practical Ideas



FLAME-PLATING GUN hurls molten charge of tungsten carbide against surface to be coated. Result is a hard and specially wear-resistant coating.

SEAMING CHUCKS and other can-making tools last much longer when carbide plated. Coating eliminates tin pickup, curbs skidding of lid on chuck.

Carbide Coating Reduces Equipment Wear

Machine parts, cutting edges, and tools reportedly last much longer in service when given a wear-resistant coating of tungsten carbide by Linde Co.'s Flame-Plating process.

The technique uses a series of rapid oxyacetylene detonations within a gun to heat carbide particles with 6-8% cobalt as a binder. When in a plastic state, particles are blasted at supersonic speed onto surfaces to be coated. Coating thicknesses range 0.001-0.010 in. Thus applied, the carbide forms a hard, dense layer with superior bond properties.

One application of the process that has become standard in many can-making plants is coating of seaming chucks and related tools. Chucks are coated on the anvil surface and occasionally on the interlock flange face. In addition to increasing the chuck's service life 6-15 times, the 0.001-in. coating eliminates tin pickup. And this, in turn, eliminates both downtime and the extra wear that would result from polishing the chuck or removing accumulated tin.

Moreover, the carbide coating grips the can lid firmly to curb its skidding on the chuck. Such skidding causes additional wear, tin pickup, and lid damage. Thus, coating the chuck permits producing better quality cans with fewer jam ups or poor seams which cause leakers. Furthermore, chuck bodies that will be surfaced with carbide can be made of less brittle metal to reduce breakage.

Same technique can be applied to many other circular parts of canning machines to increase their service lives at least 3-6 times. A partial list includes:

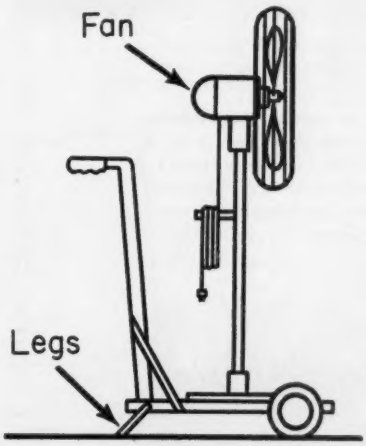
Knockout pads plated and honed; die centers, knockout rings, flanging dies and rings, which are given a 0.005 in. coat plus a ground and lapped finish; also separator fingers and can-holding chucks with a 0.002 in. coat, used as coated.

Linde Co. has a new plant at North Haven, Conn., for applying these coatings. Parts may be received from as far away as Florida. Other plating facilities are located at Indianapolis and Los Angeles.

Handy Money Depositor

At Hiland Potato Chip Co., our company-built money depositor provides convenience and a safety precaution for route salesmen. Formerly, they had to carry collected monies home in the evening. Next morning, they made a special trip to turn over the money bags to the company accountant.

Now, we've installed a letter-box-type depositor directly over a 1 x 10-ft pipe. Bags deposited into the opening drop into a first-floor safe. — *N. C. Rasmussen, Plant Manager, Hiland Potato Chip Co., Des Moines, Ia.*



Portable Fan Truck

Chances are you use small pick-up-type comfort fans in some areas of your plant. Probably they are carried from one spot to another.

It's easy to make the fan portable (sketch). Make the frames out of ½-in. pipe, mount them on rubber-tired wheels, and use handles of bicycle handle-bar grips. Crutch feet (on pipe legs) are necessary in moving fan along smooth floors. Blades and guards are obtainable from electrical supply houses.

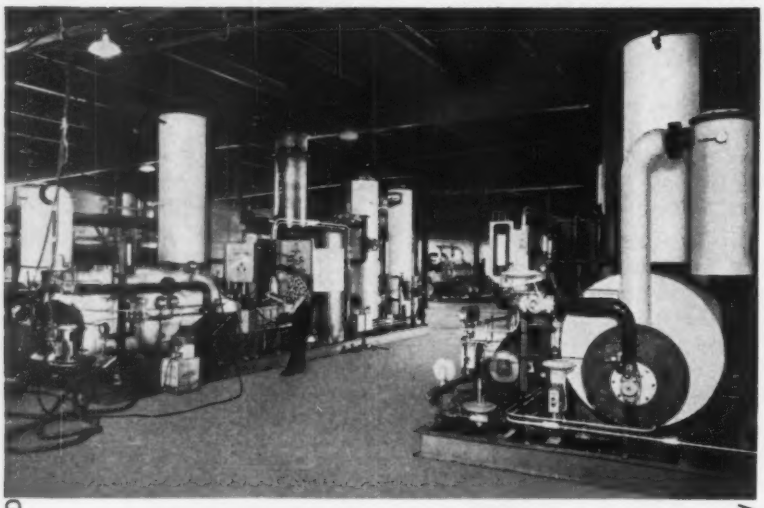
A precaution: Measure doorways and stairways before making the mobile fan.—FE Staff (Turn page)

EVEN THE BIG ONES ARE FACTORY ASSEMBLED AND THOROUGHLY TESTED AT GAS ATMOSPHERES

The pair of 10,000 cfh high-purity nitrogen generators pictured below is undergoing complete factory testing prior to shipment to the customer. This is standard practice at Gas Atmospheres.

GENERATORS MUST EXCEED SPECIFICATIONS in production, gas purity, and dryness. This rigorous testing assures buyers of quick and easy start-up without job-site disorder, and it cuts servicing and maintenance to the bone.

GAS ATMOSPHERES ORIGINATED PACKAGED GAS GENERATION SYSTEMS by increasing the productivity of various components, consolidating operations, and designing the unit into as compact an area as possible. This means smaller generators today produce greater volume, and the entire unit can be factory assembled on a common base and shipped and installed as a complete unit.



Two compact 10,000 cfh high-purity packaged nitrogen generators on test floor at Gas Atmospheres Assembly Plant.

IF YOU USE GAS, EVEN IN SMALL AMOUNTS, it might pay you to produce your own with a modern gas generation system. It costs nothing to have your operation checked out by America's foremost designer and builder of packaged gas generation systems. Just call or write *Gas Atmospheres, Inc., 5353 West 161st Street, Cleveland 35, Ohio.*

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equipment for producing industrial gases

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• SAFE • EASY • ECONOMICAL

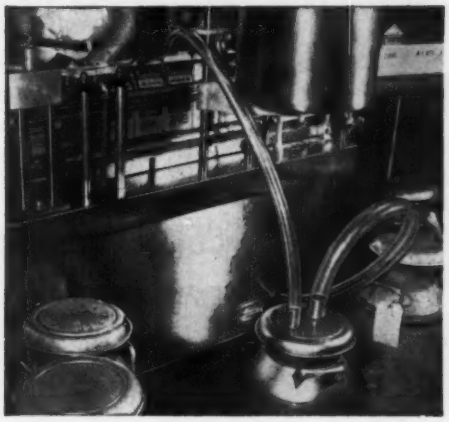
Piping of Liquid Foods and Beverages

Combining the non-contaminating properties of stainless steel . . . the flexibility of rubber . . . the clearness of glass . . . and the toughness of leather, Tygon plastic Tubing, Formulation B44-3, has no peer in food handling applications.

Completely odorless, tasteless and non-toxic, Tygon B44-3 is safe for use with even the most flavor-sensitive foods and beverages.* With a surface smoothness far greater than that of either rubber or stainless steel, Tygon will not trap minute food particles which foster bacterial growth. Tygon can be quickly cleaned, is unaffected by all common cleaning agents, and can be sterilized with steam (open-end flushing) or bactericides.

Available in over 65 standard sizes up to 4" I.D., flexible Tygon can be used with a wide range of fittings, can be put into service quickly and inexpensively.

**For processed milk and milk products, use Formulation B44-4*



Compare the unique advantages of Tygon B44-3 with any other piping medium and you'll see why more and more bottlers and food processors are standardizing on Tygon. Write for your free copy of informative Bulletin T-100 . . . today!

Plastics and Synthetics Division

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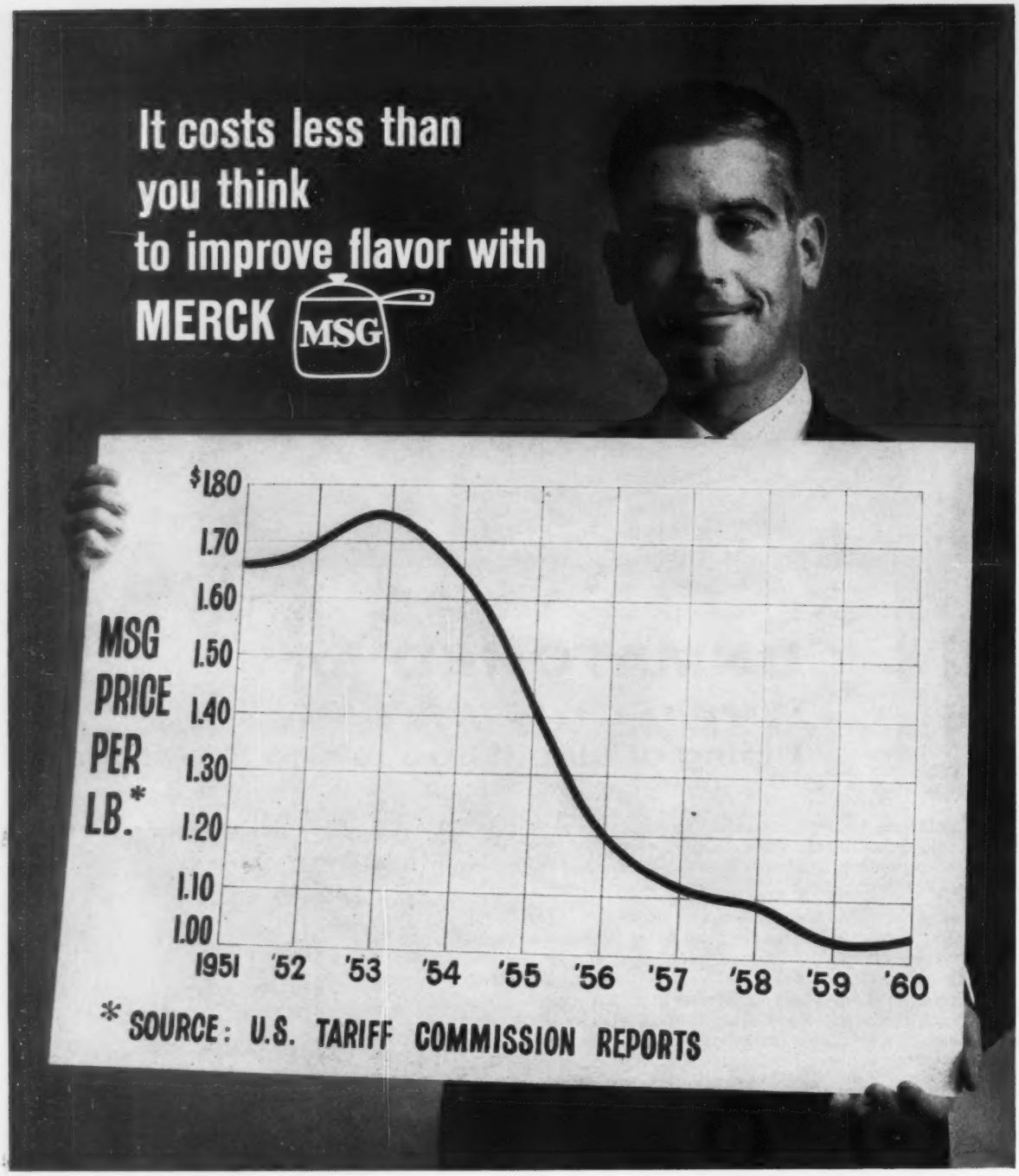

Has the cost of using MSG stopped you from improving the flavor of your products? Better take a new look at MSG economics as shown in our graph. While most food processing costs have sharply increased during the past decade, MSG has steadily decreased and leveled off.

At today's prices, your product can benefit from the addition of Merck MSG for only 1-2 mils per pound of finished product—little enough compared to the decade's high when MSG cost nearly twice as much.

When you decide to re-evaluate MSG for your product be sure to call Merck. Specialists in the Merck Food Laboratories are ready and eager to help you get the most from MSG. And a recent 100% increase in production capacity puts Merck in an excellent position to meet all your MSG requirements.

MERCK CHEMICAL DIVISION
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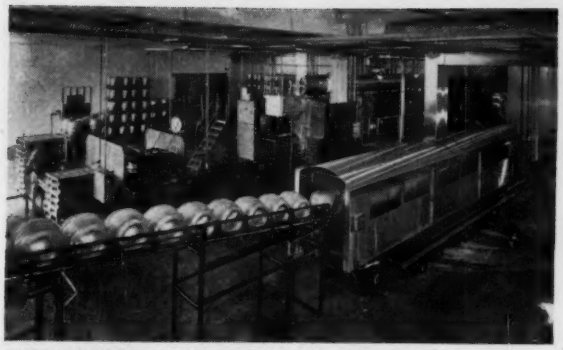
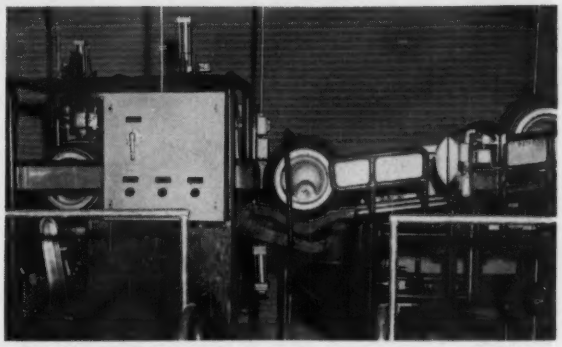
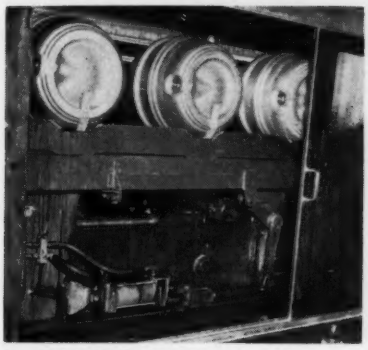
Doing It Better



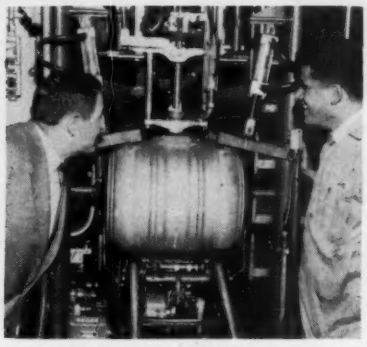
OVERALL VIEW of integrated keg-handling system. Kegs are conveyed to washer (foreground), then proceed around far end for inspection, filling, rinsing and checkweighing.



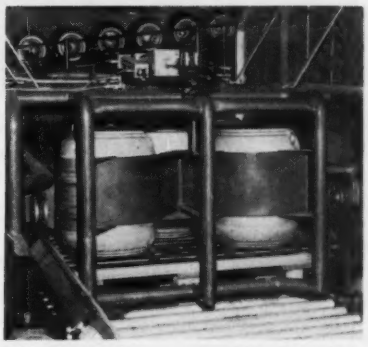
TAP-END-SENSING device (right), orients keg, indexing it 180 deg. if necessary. At de-bunging station (left), bung hole is aligned, augered out, and inspected.



IN WASHING CYCLE, kegs move on walking beam. They are washed, scrubbed, sanitized, rinsed, and dried.



CONTROLLED FILLING of kegs minimizes foaming and product turbulence. Bung is driven into hole to seal keg.



FILLED KEGS are automatically palletized in groups of five. Loaded pallet advances, is picked up by fork truck.

BURGERMEISTER BREWING CORP.

Automates Handling, Washing, and Filling of Bulk Containers

Completely automatic handling of kegs will push production of draft beer to 260 half-barrels per hr. at Burgermeister Brewing Corp., San Francisco. The system is currently processing some 240 half-barrels per hr.

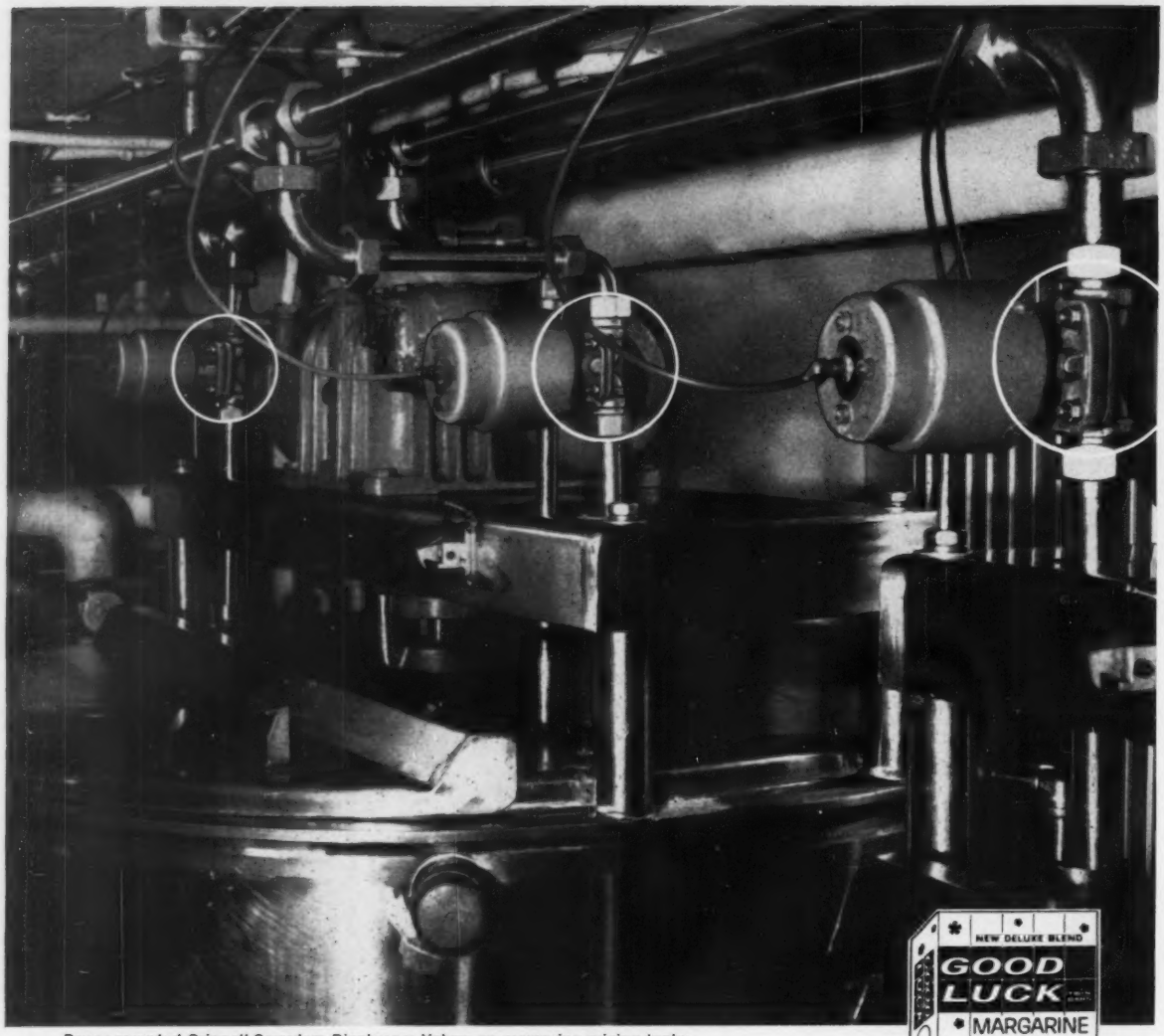
Integrated conveyor lines move kegs from incoming pallets through de-bunging, washing, inspection, and filling. A key factor in smoothing the operation is an inter-connected electrical control circuit at each station that advances the kegs only on receiving a "demand signal" from all other stations.

Entire system stresses sanitation and employee safety. It occupies some 3,600 sq. ft. of floor space, excluding the cooler storage room. Lack of refrigeration facilities in the main area poses no problem because the racker tank and lines are insulated.

In the eight-step operation:

1. Incoming empty kegs are automatically depalletized, pallets being transferred for re-use.
2. Kegs are conveyed to a tap-end-sensing station, emerge oriented.
3. Bung is located down and augered out. Bung hole is probed to insure entire removal of bung.
4. Conveyor moves kegs through cleaning cycle—washing, scrubbing, sanitizing, rinsing, and drying.
5. Kegs move to inspection station, where bung hole is automatically positioned for thorough examination of keg.
6. After inspection, the two tap valves are capped automatically.
7. Kegs go to racking station, bung hole is positioned, keg is filled, bung is inserted, keg is sealed.
8. After exterior rinsing, filled kegs are checkweighed and automatically palletized for shipment.

Known as Keg-O-Matic, the system was designed by Thermovac, Stockton, Calif. **(201)**



Power-operated Grinnell-Saunders Diaphragm Valves on margarine mixing tanks

Grinnell-Saunders Diaphragm Valves control "Good Luck" Margarine mix round-the-clock

Valves give trouble-free service on vegetable oil, milk, brine, ice water... even after 4 years!

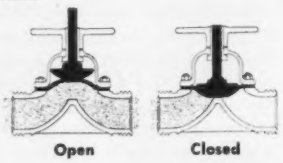
4 years ago, Lever Brothers installed stainless steel Grinnell-Saunders Diaphragm Valves in their Toronto, Ontario processing plant. The valves' job: controlling the flow of vegetable oil, milk, brine, ice water — all used in making "Good Luck" Margarine.

Today, every one of these valves is still on the job. Yet the system is in operation 24 hours a day!

Grinnell-Saunders Diaphragm Valves operate easily . . . shut off *completely* . . . even after years of tough service. There's big savings on maintenance, too!

What's more, materials flow smoothly through these stick-free valves. Bonnet mechanism is completely isolated from material in the line to prevent corrosion and contamination. And you get a wide selection of body, lining and diaphragm materials.

Learn how dependable Grinnell-Saunders Diaphragm Valves can help your operation. Write Grinnell Company, Providence 1, Rhode Island.



Open Closed

GRINNELL COMPANY, PROVIDENCE 1, R. I. • BRANCH WAREHOUSES AND DISTRIBUTORS FROM COAST TO COAST
PIPE FITTINGS • VALVES • PIPE HANGERS • PREFABRICATED PIPING • UNIT HEATERS • PIPING SPECIALTIES

. . . offers food processor impressive array of tailor-made packs designed to solve tricky product needs, pep up sales

LOW-COST PROTECTION, wide ranging properties, and versatile uses have earned flexible packages an important role in food plant operations.

A couple of statistics underscore this role. Item: Of the 4,000 plus food items on display in a typical supermarket, today's shopper can choose from among more than 2,700 flexible-packaged edibles, says H. T. Holbrook, Continental Can's sales manager-flexible films. Item: These items represent at least 1,000 ingenious combinations of flexible materials, adds Dobeckmun's Michael Caperon.

Flexibles have increased their importance to processors by meeting head-on the challenges posed by the food industry's production-marketing-packaging demands. On the all-important cost front, for example, plastic films have trended downward while rigid materials (glass and metal) have moved upwards. Significantly, Du Pont's market-analysis manager, James Brooks, feels that in the immediate future prices will continue steady to lower. It's also worth noting that last month cellophane prices, creeping upwards the past two years, were shaved 5¢ lb. on bread wrap grade.

The flow of new food products has stimulated makers of flexibles to find clever answers to tricky protection problems. Typical examples: Poly-coated Mylar for boil-bags, polymer-coated cellophane for baked goods, tailored Saran with variable moisture and gas transmission rates for meats and cheeses, and oriented PVC for shrink packages.

Radical changes in consumer buying habits have enhanced the importance of flexibles to food packers. With busy housewives planning their meals in the supermarket—Du Pont's latest study shows 7 out of 10 buying decisions are made in the store—flexibles' ability to showcase the food becomes a merchandising must. As one Du Pont salesman always tells his customers, **"Nothing sells food like the tempting sight of the product itself."**

Pressed by low-price polyethylene, cello makers are countering by refining specialty types for specific applications. States F. W. Spannagel, American Viscose: "Cellophane has an advantage here, because its basic properties—MVT rate, gas permeability, durability, heat sealing—

FE Staff

Price Comparison of Flexible Films

IMPRESSIVE ARRAY of flexible films offers the food packer a wide range of prices—from as little as 1.53¢/M² in. to 11¢. Even a single film family can offer a considerable spread—such as the 1.86¢-2.20¢ range quoted in price lists for medium density polyethylene, the 2.96¢-8.25¢ range for cellophane (which offers a greater variety of modified films for specific applications). Undoubtedly, the low prices have made polyethylene and certain other plastics popular with cost-pressed food packers.

A wise packaging choice, of course, is based on more than price. As Avisco's William Nolan and F. W. Spannagel put it: "In choosing the right film you must weigh what important quality you're looking for. Is it product protection? Durability? Sales appeal? Machinability? What matters most is the right combination of material, machine, and merchandising."

Film Type	Price/lb.	Yield Sq. in./lb.	Cost/M² in.
POLYETHYLENE			
Low Density, 1-mil	$0.46	30,000	1.53¢
Medium Density, 1-mil	0.53	29,600	1.80
Bi-axially oriented, 1-mil	1.05	30,000	3.50
POLYPROPYLENE			
Unoriented, .87-mil	0.64	35,400	1.81
Unoriented, 1-mil	0.64	30,900	2.10
Oriented, ¾-mil	1.38	45,000	2.45
Bi-axially oriented, ½-mil	1.52	60,000	2.50
Oriented, coated, ⅔-mil	1.40	40,000	3.5
CELLOPHANE			
Nitrocellulose-coated, 1-mil	0.62	22,000	2.81
Polymer-coated, 1-mil	0.74	25,000	2.96
POLYVINYL CHLORIDE			
Unoriented, ¾-mil	0.69	28,700	2.40
Oriented, ½-mil	1.35	40,000	3.38
Oriented, ¾-mil	1.35	28,200	4.78
POLYVINYLIDENE CHLORIDE			
Cryovac, .8-mil	1.16	29,000	4.00
Cryovac, 1-mil	1.15	17,000	6.60
RUBBER HYDROCHLORIDE			
Pliofilm 65BG, ⅔-mil	0.90	38,000	2.36
VITAFILM ST, 1-mil	0.86	21,500	4.00
SARAN, 1-mil	1.08	16,300	6.60
Pre-Shrunk, 1-mil	1.25	16,300	7.70
POLYESTER, 1-mil	2.60	20,000	13.0
Polymer-coated, ½-mil	3.00	27,300	11.0
Polyethylene laminate, ½-mil	2.50	32,400	8.0
Shrink-type	2.80	40,000	7.0

(Source: Manufacturers' Price Lists)

can be varied more than is the case with polyethylene."

Typical examples of "tailor-made" cellos, he says, are Avisco's new T-films (1.4 mil). Here, two light-gage sheets are laminated together with a thin polymer resin inner ply. The T-69, nitrocellulose coated, costs 7¢/1,000 sq. in.; the Saran-coated T-79, 7.68¢/1,000 sq. in.

The films are fully moisture-proof, have excellent dimensional stability, and are durable at below-freezing temperatures.

As single wall bags, Spannagel sees the films cutting into duplex sacks because of their better economy and visibility. Particular targets are snack items, rice, candies, frozen foods, and other products requiring long shelf life. The T-79 can also be used for oily, greasy products.

Looking farther ahead, William M. Nolan, Avisco's manager-market development, hopes that the T-film's superior gas and oxygen barriers will widen cellophane's place in the coffee field. Already on the market, he notes, are various coffee bag combinations such as cello/poly, cello/poly/paper, and cello/foil.

Big advantages of the 2- or 3-ply sacks, he says, are that they cost less than tin, save on shipping weight, and take up less shelf space in the store. The main drawback, he admits, is that fill speeds for the bags, at 70-90/min., are still only one-third or one-fourth that of tin cans.

Over at Du Pont, as many as 15 new or improved type cellophanes have been introduced in a recent 12-mos. period, according to A. E. Hiley, group manager-cellophane development. Most significant innovation was the new hi-yield varieties which resulted from thinning the base cello sheet.

More Sq. In./Lb.

Of special interest to food makers, the polymer-coated K-type bread wrap was upped from 21,000 sq. in./lb. to 25,000. Carrying a 79¢/lb. price tag, hi-yield cello represented a 16% cost reduction to bakers—from 3.76¢/1,000 sq. in. to 3.16¢. Since then, the price has dropped to 74¢.

A further step involved lower heat seal temperatures on MSD-60, from 300F. to 250F., to provide higher degree of trouble-free machine operations. As a result, Hiley notes, faster running speeds are possible since film needs less contact time with heater plates.

A more recent Du Pont upgrading aims at making cello more durable during cold weather months. Moisture-sensitive, the film often becomes less pliable under low humidity conditions. By making basic improvements in the film's structure, company hopes that the material will be less prone to brittleness when improperly handled or stored during the cold months.

A typical example of how cello producers custom-make new film types for specific applications is Olin's new OF-20, a special antioxidant film designed to prevent "off" flavors and odors in high-oil-content foods (such as snack items). As George R. Johnson, Olin's marketing director-film, explains: "Although makers of potato chips and snacks use antioxidants in their cooking oils, these are frequently dissipated by heat in the cooking process. We found that most 'off' flavors came from thin layer of oil deposited on the package's inner surface. To curb this, we applied an antioxidant coating to both sides of the base sheet. Tests later showed that the new cello lengthened shelf-life up to 50% over standard film."

Biggest challenge to cellophane's supremacy among food films comes from polyethylene. To cost-conscious food makers, poly's favorable price differential has been attractive enough to cancel out the machine handling difficulties that slowed the plastic's acceptance in the past.

Then, too, many were said to be waiting for FDA clearance. According to Vincent D. McCarthy, director of plastic sales, U. S. Industrial Chemicals, "Official approval clears up what was a dark area, can mean a possible 30-40% increase in the use of polyethylene in the next 12 mos. for processed meats, cheese, delicatessen items, and cereals."

R. H. Motz, group manager-polyethylene development, Du Pont, feels that **"Polyethylene has solved the big problems; now it is a matter of making refinements."** Among the developments which have improved the film's machinability, he notes, are: 1) higher density resins which provide stiffer films, 2) attachments for bread wrappers which give more precise temperature controls, 3) line equipment specifically designed for the plastic, and 4) end labels with low-melt adhesives that avoid film burning.

One "refinement" Motz has in mind is faster running speeds without increasing the number of rejects. For instance, he notes, 1-lb. bread loaves are poly-wrapped at a 45-50/min. rate vs. cellophane's 55-60/min. clip. Faster speeds are possible with poly, but rejects tend to increase, too, he warns. Using a thicker poly, 1¼ mil, helps to keep torn wraps down, he points out.

Bagged Frozens

Produce, of course, remains the biggest user of poly film in the food field, consuming 87-mill. lbs. last year. This is due to the plastic's superior strength over cello, according to A. E. Irvine, marketing manager-flexible materials, Union Carbide Plastics.

More recently, polyethylene has set its sights on the frozen food field, where the volume of IQF items packed in plastic bags soared 70% last year—from 19-mill. lbs. to 32-mill. Libby, McNeill & Libby, which claims first place in the field, says its sales of bagged frozens more than doubled in '60. Significantly, the packer observes that sales have not been at the expense of carton-packed versions, instead, have tapped a new market of bulk buyers.

At one time, bag breakage was a headache. But, according to USI's McCarthy, this has been curbed by greater uniformity in film and machine settings, as well as improved form-fill equipment.

Color fading among the green vegetables is still said to be nettlesome. However, since the color comes back in the cooking process, this hasn't been a sales problem. In any event, packers are getting around this by using more printing and colors on the package to block incoming light rays.

USI reports that it recently cross-checked films of three different manufacturers, made by two different processes, for their feasibility with IQF bags. According to McCarthy, the tests showed that breakage could be reduced from as high as 50% down to as low as 2-3%. Furthermore, he adds, cast film was found almost as effective as the blown type.

Poly bags are also catching on fast for specialty loaves, rolls, buns, and cookies, Union Carbide's Irvine points out. While admitting that "they're not as neat-looking as overwrapped items," he feels "they have a certain appeal because they open and reclose more easily and can be used to store foods in the refrigerator."

As polyethylene producers continue to hack away at cellophane's long lead, they are beginning to cast nervous looks over their shoulder at a new plastic—polypropylene.

This newest rival scored its first beat in the food field last year when Ward Baking began using an unoriented type for bread wraps. More recently, a non-balanced oriented version (Kordite) debuted as a produce bag. A polypropylene liner is also being used in cookie packages by Pepperidge Farms for extra grease-proofness. And last month Cryovac, after a year of testing, brought out what it claims to be the first balanced biaxially oriented polypropylene that shrinks equally in all directions.

Strong Points

Despite its brief commercial life, polypropylene is looked upon as a strong contender in the overwrap field because of certain properties. These are summed up by R. L. Wibbens, sales development, Hercules Powder, as follows: **1) Strength** — Cast polypropylene is stronger than low density polyethylene, comparable with medium density polyethylene. **2) Barrier properties**—Has half the MVTR of low density polyethylene, is comparable with the high density version, and is equal to Saran-coated cellophane. As for gas transmission, polypropylene is twice as good as low density polyethylene, slightly poorer than the high density type, and, generally, lags behind cellophane. **3) Stiffness** — Better than polyethylene, poorer than cellophane. **4) Clarity** —Can be made to haze levels comparable with cellophane while polyethylenes generally suffer from slight to severe haziness. Furthermore, he adds, cast polypropylene has good grease-proofness not hurt by creasing, a high surface hardness which makes it less susceptible to abrasive marring, and a higher use temperature than polyethylene.

Orienting the film, just about

Flexible Packs That Spark

New answers to old problems—that's the driving force which has triggered the fast growth of flexible packaging in the food industry. Continual improvements in films, and versatile com-

► **SERVE-SAVE** pack for sliced cheeses is a lamination of cellophane, Saran, and polyethylene. Two individually-sealed joined sections, each containing four slices of product, enables housewife to open one unit while the second one remains sealed until needed.

► **LATEST ENTRANT** in plastic sweepstakes, polypropylene, is catching on with bakery, produce items. Oriented bag for lettuce is said to offer twice the moisture barrier protection of previously used film.

► **CARRYING HANDLE** is built-in feature of polyethylene bag that is a bottom-gusset sack. Gusset is serrated at given point and handle is formed when sack is zipped open along the serration. Thus handle is protected until bag is opened.

doubles the plastic's property values, according to Dr. Verne Grassi, Hercules Powder's director of development. Thus a ½-mil oriented version will be comparable to a 1-mil non-oriented film. Orientation also gives the film excellent low temperature resistance, he adds.

As with any new film, polypropylene's machinability sparks considerable discussion. Wibbens feels that none of the problems are insurmountable, pointedly notes: **"You heard the same thing about polyethylene when it came out, but as the price dropped people found ways to solve the handling difficulties."**

To lick shortcomings that may crop up, Hercules has been running machinery trials with 30 different makes. These include regular- (cartons) and irregular-shapes (bread), form-fill-seal units, gusseted-bag makers, and fin-seal equipment. The trial runs showed no outstanding problem areas, Wibbens reports.

Some trouble was encountered with cellophane machines when the plastic stuck to exposed metal heaters. Wibbens feels this can be licked by using the Teflon-covered heaters and Teflon-Fiberglas belt heater coverings found on polyethylene machines. Other possible solutions, he adds, are sonic sealers or the impulse style hot wire sealer (though this may lead to some puckering, which, in turn, could be eliminated by a heat tunnel).

Because polypropylene is a tough film, cut-off knives may tend to dull. Wibbens says that heated blades have partially overcome this, but are not the final answer. More study is needed on such questions as serrated vs. straight edge blades as well as blade angle positions, he says.

Static buildup in the film, according to Dr. Grassi, has been taken care of by the use of coatings, additives, and grounding devices on machines.

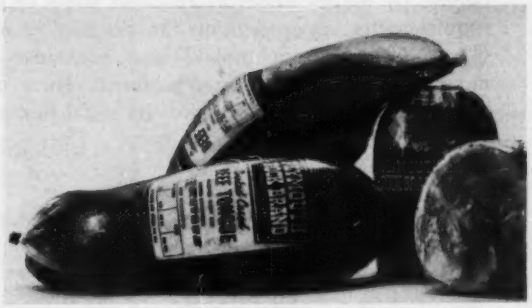
While cellophane and polyethylene take up more than 90% of the flexible packaging market, other films are fighting hard to make themselves more attractive to food packers. Here's a rundown on what is going on in other key areas:

► **Polyester:** Long known as one of the toughest plastics around, Mylar is being modified for more uses in the food industry. Just out is a ½-mil K-coated version, for make-and-fill equipment, with

Consumer's Dollar-Vote . . .

binations of materials, have helped flexibles to bring new merchandising opportunities to processors, added convenience to consumers. Here is a small sampling of recent innovations.

► **SANDWICH WRAP,** comprising a microcrystalline wax coating placed between a 1.3-mil Saran on the inside and ¾-mil Saran on the outside, gives cheese a near-perfect air-tight seal for longer shelf life in store and home. After housewife cuts off slice, she uses end layer of film-wax-film lamination to cover exposed product surface.



► **CONTOUR BAGS** made with new heat-shrinkable polyester film provide longer shelf life due to moisture-, vapor-resistance. Plastic shrinks uniformly to eliminate any distortion of printing, conforms closely to even such odd-shaped items as tongue.

► **SEE-THROUGH MULTI-PACK** results from banding with transparent oriented polyvinyl chloride film that shrinks tightly around canisters without any sacrifice in strength.

stronger seals, a better oxygen barrier, and less tendency to develop flexing problems.

Deeper Draw

Also new is a "formable" type that gives a deeper draw and a larger package for luncheon meats and cheeses. According to C. J. Renschler, of Du Pont's Chestnut Run Laboratory-film department, the new type can be drawn to 1½ in. in a 5 x 5-in. area, compared to a forerunner which could be drawn to only ¾ in. in a 2½ x 3¼-in. area. As a result, he says, you can pack more product into the same package.

This version also lends itself to broader product applications. When used with the new Flex-Vac 6x14, which employs vertical filling, the Mylar can take liquid items, as against the solid products it was restricted to on the older 6x12 equipment.

► **REVOLUTIONARY POUCH** has individual compartments separated by a patented rupturable seal which breaks under a given amount of pressure to form a single self-mixing unit for contents. Polyester film is coated or laminated with polyethylene. Seal consists of very thin foil coated with polyethylene of varying thickness depending on desired amount of pressure to break the seal. Possible uses: Pancake mix, cake mix, salad dressings.

Heat-shrinkable Mylar, which continues to gain as a frozen poultry wrap, has good possibilities for multiple packaging, Renschler adds. Whereas other films used for this purpose tend to stretch after a while, he contends, Mylar holds its rigid grip because it doesn't "relax."

Technical research on polyester film, reports Minnesota Mining & Manufacturing, is aimed at adapting the plastic for freeze-drieds and juice crystals. Irradiation techniques are also being probed, the company adds.

► **Saran:** Dow Chemical's (Dobeckmun Div.) Wrap-S, with its good moisture and gas barriers, continues to advance in the shrink field of vacuumized packaging. Also used for various meat cuts, it has extended a normal 3-4 product day shelf life to as much as

How To Choose the Right Flexible Package

Because there is no universal flexible film that protects adequately all food products, your choice among competing materials will be geared to your own needs. The helpful guide below, by Riegel Paper Corp., lists some of the more critical requirements imposed upon the packaging material by your (1) product, (2) machine, (3) unit container, and (4) normal marketing and distribution patterns. Here are questions to ask yourself when looking for the right flexible:

Product Characteristics:

1. Is a particular strength or rigidity required?
2. Will abrasion- or puncture-resistance be needed?
3. Will water vapor resistance be necessary?
4. Is there a critical moisture content, or "index of failure" such as caking, at which product is no longer saleable?
5. Will oil content require grease-resistance?
6. Is there a "free" water content that calls for water-proofness or wet strength?
7. Must flavor or odor be retained, or foreign odors and flavors be kept out?
8. Are there any special chemical properties that might affect the package?
9. Is any special processing (such as sterilization) involved?
10. Will vacuum or gas packaging be required?

Machinery Characteristics:

1. What type, model, and make of packaging equipment is used?
2. At what speed is the equipment run?
3. What are the filling equipment's requirements?
4. What kind of closures are used?
5. What special properties must the packaging material have for machine handling (such as pliability, rigidity, slip, strength)?

Package Characteristics:

1. What is the unit size?
2. Is the printing for functional identification only?
3. Is multi-color design important for your merchandising?
4. Is transparency more important than opacity?
5. How will individual units be packed?

Marketing Characteristics:

1. How long will your product be warehoused, and under what conditions?
2. How is the product shipped, and how long is it in-transit?
3. What is the product's selling environment?
4. What is the product's expected "shelf life?"

two weeks. The S-film also shows "great potential" for packaging fresh ground beef on Kartridge-Pak machines, according to Dobeckmun's Caperon.

A thinner (.4 mil) film is now available to food processors compared to the ½ mil that was the previous minimum thickness. And machinability has been upgraded by new techniques that result from the development of flatter films, provide for better control of surface slip, and make for improved heat sealability.

Merchandising appeal has been heightened, too. Dobeckmun now prints on thinner gages than was possible before, and up to 5 colors on ½-mil film.

► **Polyvinyl chloride:** Further advances in shrink packaging are reported by Reynolds for its oriented PVC film (Reynolon). A new patented perforating process, according to Woodrow J. Vogel, general manager-plastics, "produces fused holes to maintain film strength and prevent tearing from originating at the holes. It gives produce the breathing film needed to maintain quality."

Also, he adds, thinner gages (½ and ¾ mil) resulting from biaxial orientation have led to better machinability and finer printing, have opened new markets for the PVC film. Some of the markets: Cheese wrapping at store level; bacon and frankfurter overwraps; specialty baked goods in foil trays; carton overwrap for candies requiring low temperature storage.

Multi-packing is looked on as a growth field for the clear, strong, heat-shrinkable film. A Campbell wrapper using Reynolon can bundle cans or canisters at speeds up to 100/min.—a rate which, Vogel maintains, is comparable to paperboard.

Because no single flexible solves all the complex problems connected with food packaging, wedding films to other films or materials to supplement or bolster base properties continues to spur new advances.

A typical example is a new packaging system just introduced by Liquid Film Corp., which combines wax, polyethylene, and butyl rubber. The three, applied in liquid form to cheese, for instance, cover all sides of the product except the top. This coating quickly hardens, then the product is Saran-wrapped in a Wrap-King unit.

Other products Liquid Film hopes will be feasible for the wax-plastic skin: Stacked Canadian bacon, frozen meats and fish, specialty-type sliced breads.

Looking to the future, H. C. Horst, of Du Pont's Chestnut Run Laboratory, feels that "some of the new polymers and copolymers now on the drawing board look attractive from the viewpoint of improved barrier properties." However, he doesn't anticipate "that any plastic material providing an order of magnitude improvement in barrier properties will be available in the immediate future."

"Gas permeability seems to be the property which needs upgrading the most on the newer films," contends Florren E. Long, manager-product development research, flexible packaging div., Continental Can. "Polyvinylidene chloride coatings have been found in general to provide the best results in reducing gas permeabilities, and in some cases, moisture permeabilities as well."

Where Flexibles Are Headed in The Food Field

Food Market for Polyolefins*

	1960 SALES (Millions of lbs.)	1965 EST. SALES	1965 MAX. POTENTIAL	1965 PENETRATION %
Frozen Foods	Negligible	8	21	40%
Candy, Nuts, Gum	6	9	—	—
Cereals, Prepared Mix	Negligible	2	32	6%
Baked Goods	6	70	125	56%
Meat, Poultry, Fish	1	7	38	15%
Produce	87	127	252	50%
TOTAL	100	223		

*Polyethylene, polypropylene

Source: Monsanto Chemical Co.

FAVORITE target of the maker of flexible packaging is the food manufacturing plant. For 71% of the dollar volume of converted flexible packaging, according to U. S. Dept. of Commerce figures, comes from the food industry.

And for the leading flexible film, cellophane, the food industry looms even more importantly. Consensus among suppliers is that food end-uses consume about 75% of cellophane's annual tonnage — or 329-mill. lbs. out of last year's 439-mill. lb. output. As to the amount of polyethylene film that ends up on food packages, estimates vary all over the lot, but most guesses put it around the 33% level.

Between them, cellophane and polyethylene have the flexible film market pretty much to themselves tonnage-wise. Together, they account for slightly more than 90% of the flexible film output, leaving less than 10% for a host of competing types—such as acetate, vinyl, polyester, PVC, polypropylene, polystyrene, rubber hydrochloride, etc.

The flow of new plastics and unfavorable price trends have slowed cellophane's pace in recent years. For example, cellophane's share-of-output last year among the flexibles was 62.2% vs. 69.5% in 1955, and 87.7% in 1950. During the first half of the last decade, cellophane spurted along with an annual growth rate of 7.8%. But in the decade's last half this pace trailed off to a 4.06% annual gain—and in the '56-'60 period it was down to 2.6%.

There are indications that cellophane may have trouble matching its more recent growth rate in the years ahead. A U. S. Dept. of Commerce study last year forecast cellophane sales of 475-525 mill. lbs. by '65. Considering last year's output of 439-mill. lbs., this implies an annual increase ranging from 1.6% to 3.8%.

Suppliers don't go along with this forecast. American Viscose, for one, feels that cellophane has a good chance of reaching a 550-mill. lb. level by '65—implying a growth rate of 5%. And DuPont believes that when flexible films pass the 1-bill. lb. milestone, cellophane will still have a 55% share-of-output. This, however, would still represent quite a drop from cellophane's current 62% share-of-output.

No Slowdown for Food

It's worth noting that while some of the steam may be going out of cellophane's annual gains, the food industry's liking for the film has not flagged. **From 1951 to 1960, while total cellophane tonnage rose 58%—278 to 439-mill. lbs.—food industry usage perked up a brisk 68%—from 197-mill. to 329-mill. lbs.**

Behind this trend is the cellophane maker's ability to alter the film into many different modifications, each designed to answer the needs of a particular food product. As one supplier official stresses: "Cellophane is many films, not just one. It lends itself extremely well to necessary modifications. For example, the cellophane used for fresh meat must be different from the one for smoked meat, and further altered for frankfurters to get the best results."

This variety of tailor-made types has helped cellophane build up a better than two-to-one lead over the rival plastics in the food field. But most seers predict that cellophane's margin will become thinner in the next few years.

For one thing, they point to the price movements that show a rising curve for cellophane, a declining one for plastics. Thus, for example, while cellophane's average lb. price rose from 54¢ to 60¢ in the '55-'60 period, that of polyethylene (the film giving cellophane its stiffest challenge) dropped from 59¢ to as little as 46¢. Once the plastics' price crossed under that of cellophane, work on developing machinery to handle the polyolefin began to accelerate.

Looking to the future, suppliers of plastic film see a steadily rising volume in the food field.

FLEXIBLE FILMS

In a presentation for the Society of the Plastics Industry this summer, D. R. Mahaney, Monsanto Chemical's market research and development department, forecast an annual 16.6% growth for polyolefin films from now through '65. **Even more significantly, he predicted that the food industry's use of the films (polyethylene and polypropylene) would soar with an annual growth rate of 24.6%—up from an estimated 100-mill. lbs. in '60 to 223-mill. lbs. in '65.**

A similar picture is drawn by Vincent D. McCarthy, sales chief, U. S. Industrial Chemicals. He looks for 460-mill. lb. consumption level of polyethylene by the decade's mid-point. Around 70%—or 330-mill. lbs.—will go into produce and certain other nonfood items, he says, and the remaining 130-mill. lbs. will be used by bakers (where it could become the major breadwrap) and other food and nonfood users.

Where the Boom Is

A more specific breakdown of where the polyolefins will go in the food industry is provided by Mahaney. He divides the expected 223-mill. lb. consumption as follows: Produce, 127 mill. lb.; baked goods, 70 mill.; candy, nuts, and gum, 9 mill.; frozen foods, 8 mill.; meat, poultry, and fish, 7 mill.; and cereals and prepared mixes, 2 mill. Disregarding the confectionery area, he figures this usage will represent a 46% penetration of a market that consumes some 468 mill. lb. of packaging materials.

Just how this market will be divided between polyethylene and polypropylene is anybody's guess. The newer polyolefin is just getting its fibers wet in the food industry and guesstimates on future consumption range all over the lot. One producer says that output of polypropylene film could reach 80 mill. lbs. by '65, and possibly 100 mill. lb., with food taking over half of the volume.

A newcomer to the polypropylene field, Cryovac, sees the market shaping up as follows: Out of an estimated film output of 41 mill. lb., around 30 mill. lb. will go into the food industry. Food usage will be divided thusly: Confectionery, 1 mill. lb.; produce, 1½ mill. lb.; bread, 24 mill.; and other baked goods, 3½ mill.

As you can see, baked goods is the area where rival firms consider the stakes the biggest. An American Viscose market study declares that "baked foods use more flexible packaging materials than any other category of consumer goods." And a Du Pont analysis points out that whereas 10 yrs. ago film was used for only 1/3 of all baked goods, today the figure is closer to 2/3. Reynolds Metals figures that bakers shell out more than $60 mill./yr. on their package wraps.

Baked goods take 123.5 mill. lb. of cellophane, American Viscose reports, or 37% of the amount of film used by the food industry. White bread siphons off 60 mill. lb. of cellophane, biscuits & crackers another 28 mill. Among the specialty breads, where premium prices allow a leeway on costs, cellophane still holds something like 85% of the packaging market, according to American Viscose. Du Pont figures that of the 41 mill. loaves of bread made each baking day, 25 mill.—or 5 mill. more than a year ago—are sent to market in transparent film wraps.

Nothing Like a Price

In the past, cellophane has earned its prominent position in baked goods because of the several modified types that provide moisture- and grease-proofness, anti-blocking characteristics (for neat stacking on store shelves), machinability, transparency, excellent reproduction of bright colors, gloss and sparkle. To get a foothold with cost-conscious bread bakers, rival films have pushed ahead with price cuts. In the past year, for instance, Pliofilm was shaved 10¢ lb. and polypropylene came down from $1/lb. to 65¢.

"No, No, No, Wardlow! I want a package that screams out, 'Buy me—I'm the best stinking product on the market!'"

When cellophane producers came out with a new film last year that increased the per lb. yield 19% with no price increase, they hoped this would counter polyethylene's price appeal. But two recent developments suggest that their hopes were in vain.

For one thing, plastic producers now feel their film will cut an even bigger swath in the breadwrap than they had expected at the turn of the year. At the start of '61, they were predicting that 8-10 mill. lb. of poly would be used for breadwraps this year vs. 3 mill. in '59, 6 mill. in '60. This summer, however, they raised their sights, and now forecast a 20-30 mill. lb. volume for '61.

Their confidence must have rested on solid ground for last month, just before the Baking Show opened, cello producers cut prices of their polymer-coated breadwraps grade a nickel a pound. This brought the cost-per-1,000 sq. in. down from 3.16¢ to 2.96¢—as against 2.27¢ for medium density polyethylene, 2.06¢ for polypropylene, and 2.36¢ for Pliofilm.

Of course, price alone isn't enough to explain polyethylene's meteoric rise in breadwrapping. A prominent film producer explains the growth thusly: "Suppliers have improved gage variations, standardized on workable types, devised new paper end-labels using low-melt adhesives, and developed successful conversion kits to modify existing machinery. Clarity has also been improved.

"Machinery companies have also developed conversion kits and provided new equipment to handle paper, plastic, or cellophane. And bakers have devised tighter controls and trained machine operators to use thermoplastic films."

Pliofilm, a relatively newcomer, is also making a bid for a bigger chunk of the breadwrap business. The same source quoted above has this to say about the rubber hydrochloride: "Although costing more than polyethylene, it seals easier and requires less critical machine adjustments. A bread wrap grade of only 2/3 mil thick, is said to have adequate strength, excellent gloss and transparency, and a 'soft feel.' It is more uniform in gage than polyethylene." (End)

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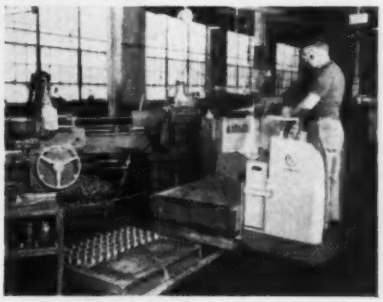

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Yarway Series 40 Impulse Steam Traps on stainless steel cooking kettles

YARWAY news briefs

from **Yarnall-Waring Company,** *Philadelphia 18, Pa.*

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STEAM TRAPS STOCKED AND SOLD BY 270 LOCAL INDUSTRIAL DISTRIBUTORS

Lady's Choice Foods plant superintendent, Jack McFeron, checks valve on return line from Yarway traps

WHAT'S COOKING?

More than 3 times as much production with Yarway Impulse Steam Traps

Main objective of a recent modernization program at Lady's Choice Foods, San Leandro, Calif. was more production—and they got it!

One vital modernization step was the selection of Yarway Series 40 Impulse Steam Traps as a replacement of the old style steam traps formerly used. These Yarway Series 40 traps, designed especially for high capacity applications like the cooking kettles in this plant, were selected for (1) their effectiveness and (2) their small size which enabled them to fit into the new compact piping layout.

Results? Lady's Choice Foods has increased production from 2 batches a day to 7 batches a day.

Can Yarway Impulse Steam Traps help you "cook up" more production and profits? Find out by letting a Yarway Engineer check your steam trapping. Write Yarway now. While you're about it, ask for Bulletin T-1743.

CAPACITY—PLUS

Yarway Series 40 traps feature not only high capacity, but also *high temperature discharge characteristics, excellent low pressure operation, no airbinding, operation against back pressures up to 40%, stainless steel construction.*

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AVERAGE CONDENSATE LOADS	EXTRA HEAVY CONDENSATE LOADS	LIGHT CONDENSATE LOADS
Series 60	Series 40	No. 30

New Entry in Expanding Dietary Field

Introduction of new low-calorie food line, "Figure Control," by Duffy-Mott Co., is backed by firm's contention that 88% of adult public is concerned about weight. Firm emphasizes a $200 million annual expenditure on dietary products. Since '50, cases of low-calorie beverages alone jumped from 100,000 to 6 million. This year it's predicted 15 million cases will be consumed.

Trend is further supported by American Dairy Assn. estimates that 17% of Americans, over 15 yrs. old, are on diets.

New D-M dietary line includes 58 items, from chicken-a-la-king to chocolate topping. Foods are high in nutrition, but low in calories.

Campbell's Long-Range Product Planning

Marketing and profit planning have a surer chance for success by coordination of strategies, according to Campbell Soup Co.'s O. H. Curry.

A 5-yr. forecast is annually prepared, integrating individual product planning with long-range program. Forecast is finalized in form of an earnings statement, based on expected growth in existing products, plus new product plans, plus an "X" factor for anticipated unknown new products.

When planning individual items, Campbell uses product's volume potential suggested by the marketing organization. Objective is to gage long range contributions product will make when volume potential is reached.

Cool Look at Robot Sellers

Blue-sky predictions for automatic selling (automatic cafeterias, push button grocery stores, credit card vending, etc.) are a long way from the practical stage, says Pepsi-Cola's Charles N. Baker.

Baker feels that the small number of manufacturers researching and making vending units, and the lean capital available for R&D, forces the industry to concentrate on problems at hand before tackling more spectacular changes.

Vending machine food sales for '60, reports the Nat'l Automatic Merchandising Assn., amounted to 19% in hot cup beverages; salads, sandwiches and pastry totaled 3.5%; while hot food sales increased to 1.9% from 1.6% in '59. A trend to 10¢ hot beverages is evident with 83% vended at a dime, compared with 75% in '59.

Airline Food Service Under Scrutiny

Reappraisals of airline food service are under joint discussion by domestic lines. CAB chmn. Boyde expresses view that more attention should be devoted to pure transportation and less to cabin services.

Food service on 11 major domestic airlines has jumped from $40.9-mill. in '57 to $64.1-mill. in '60—a 21% jump.

Discussions relate to extent of flight meal service provided free, charges that should be made, and elimination of some food items.

Marketing Signals

New dietary entry . . .

Long-range planning

. . . Supermarket growth

Sampling of Frozen Food Complaints

Recent menu survey of 8,000 U. S. families shows four out of 10 serve one or more frozen products. Vegetables were mentioned most with a high of 22%. Buns, rolls, and other bakery products were low with 2%.

Nat'l Family Opinion poll also found: 21% complained of products' poor flavor, 16% said package size is inconvenient, and 15% claim frozens are too expensive. 4% found packages hard to open.

Greatest market potential lies in $10,000-and-over income bracket where 59% mentioned frozens as weekly market basket items, while only 30% of families with incomes under $3,000 claimed regular use.

Bigger Stores Lengthen Lead

Nielsen's annual "Review of Retail Grocery Store Trends" indicates a $6-billion increase in total grocery store sales between '57 and '60 went to larger outlets. Dollar volume of smaller outlets declined both in dollars and share of total during same interval.

Also, only 39,500 stores accounted for 70% of annual sales in '60 as against 50,325 in '54.

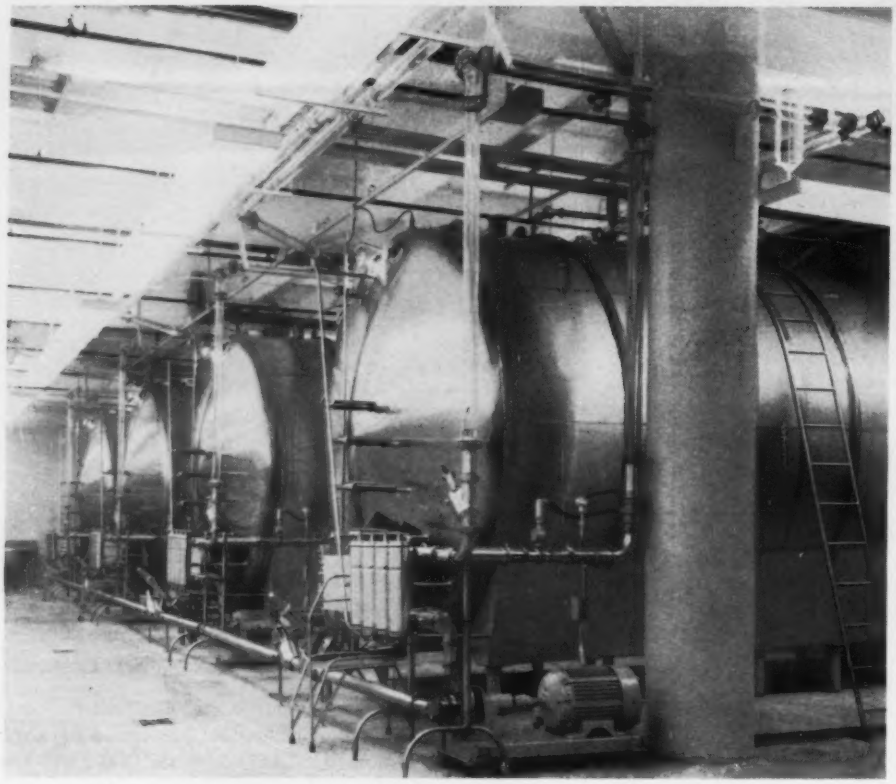
BRIEFS

Helpful Guidelist to information sources in market research and economic forecasting is offered by American Management Assn. Material is organized by the use that research practitioners will make of it.

American Dairy Assn. will spend 6.6% of its budget on product improvement while 2.6% is allocated to market research.

Breweries continue decline as Internal Revenue Service now lists 221 plants in 33 states vs. 225 in '60, 230 in '59, and 386 10 yrs. ago.

Instant potato market now totals $35-mill./yr., double its volume of two years ago, reports R. T. French Co.



EQUIPPED with in-line flowmeters, any of these 15,000 gal. tanks can be used for syrup batching at Pepsi Cola.

Simultaneous Metering Speeds Panel-Controlled Batching

Pushbutton system of in-line flowmeters and air-operated valves batches 15,000 gal. of bottling syrup in 40 min. All tanks and pipelines cleaned by CIP

PROCESSORS seeking the latest in high-speed simultaneous batching of liquid ingredients can find it in Pepsi Cola Company's syrup plant in Long Island City, N. Y.

Entirely under pushbutton control of one operator, the compact system produces 15,000 gal. of bottling syrup in about 40 min. Simultaneous delivery of the three syrup ingredients—filtered treated water, liquid sugar, and flavoring—is the key to this production rate. And an elaborate system of mechanical and electrical interlocks assures foolproof operation.

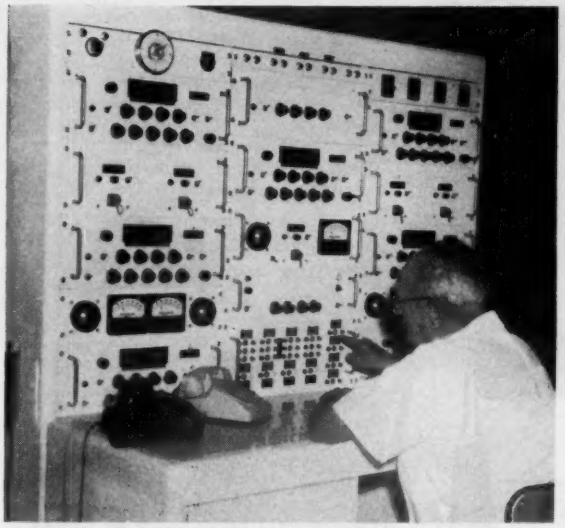
Furthermore, circuits for automatic in-place cleaning of all equipment and pipelines will be integrated with the batching system.

After laboratory tests on a finished batch, syrup can either be pumped through a filter directly to tank trucks or stored temporarily in the batching tank.

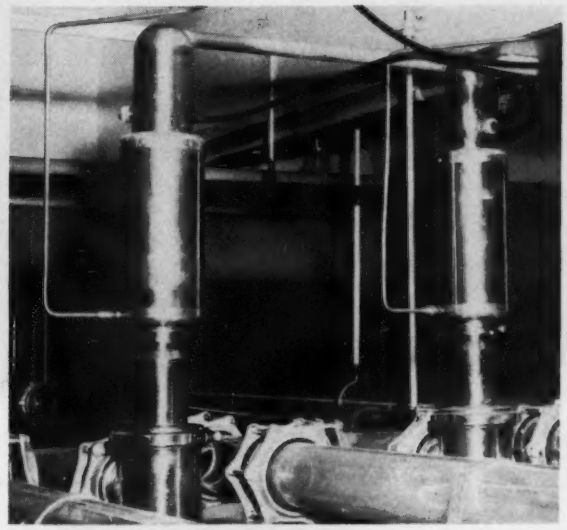
The installation consists essentially of four 15,000-gal. agitated tanks, a control panel, air-operated valves, and in-line flowmeters. All of the equipment is of stainless steel. Overhead piping is of glass, which Pepsi has used with good results for years.

In addition to monitoring the batching, the control panel provides a permanent record in the form of a typewritten printout. This contains the date and time of batching, quantities of each ingredient used, the time and

LEONARD TRAUBERMAN
Associate Editor, "Food Engineering"



CONTROL PANEL monitors simultaneous delivery of syrup ingredients, also records production data.



AIR OPERATED VALVES close when flowmeter signals that predetermined volume has been delivered.

amount of syrup delivered to tank trucks, and the particular pump and line used.

Flowmeter vs. Load Cell

Choice of flowmeters rather than load cells as metering units for the system was based on several considerations:

1. Load cells available at the time the system was designed did not have the required capacity—in excess of 200,000 lb. Today, however, such units are available.
2. To minimize batching time, ingredients had to be delivered simultaneously. Individual flowmeters on each ingredient line permit this, whereas load cells provide only for sequential batching.
3. With use of flowmeters, any of the four tanks can be used either as a batching or storage unit. In a comparable load-cell system (FE Feb. '61, p. 49), only one tank serves as a batching unit.

System in Action

To prepare a batch, operator sets the required ingredient quantities on the panel board, and selects the particular batching tank. Next, he pushes a start button which opens the air-operated valves on each ingredient line and starts the pumps.

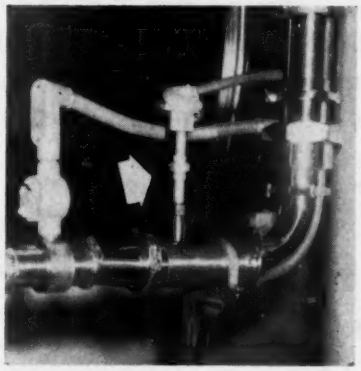
As liquids flow through each line, they pass through totalizing flowmeters which signal the control panel when required quantities have been delivered. This signal stops the pumps and closes the valves.

The flowmeter houses a turbine-type rotor imbedded with a magnet. As liquid flows through the unit the rotor generates electronic pulses proportional to rate of flow.

Since metering is on a volumetric basis, the flowmeter is preceded by a thermocouple in the line. It gages any deviation in liquid temperature from that of the meter calibration, and sends an automatic temperature-compensating signal to the control panel. Thus, although the volume of liquid delivered may vary, its weight is constant.

The metering and panel control was engineered by Potter Aeronautical Corp., Union, N. J.

Also actuated by the control panel are the air-actuated feed valves specially designed by Ladish Co.'s Fesco Div. Originally they were air-opened and spring-closed, with controlled closing rates. However, it proved advisable to add air to close with spring assist because of the large flow rates and high suction pressures.



CLOSEUP of flowmeter shows thermocouple (arrow) which corrects the flow by sending temperature-compensating signal to control panel.

In operation, the start signal from the flowmeter operates a relay which both starts the pump and energizes the solenoid air valve controlling the sanitary valve. Latter has two Microswitches, one which closes only when valve is fully closed, the other when fully open.

These switches light pilot lamps on the control board to indicate valve position. When the meter reaches its predetermined count, the above sequence is reversed. However, a pet cock on the discharge port of the air solenoid valve is adjusted to give a light second closing rate to avoid shocks in the pipeline.

Final operation in the syrup making is agitating the batch. Operator then sends a syrup sample to the lab by pneumatic conveyor, and analytical results are available in 3-4 min.

To prevent accumulation of condensed moisture on the surface of a batch stored overnight, the tank agitator is started several times during the night by a clock control. This eliminates any possibility of microbial contamination.

(End)

Profitable food products "GET-propelled"

Fast-moving food items get their sales speed from satisfied customers who keep coming back for more. Helping processors of fine foods improve flavor and texture has been CLINTON's business since before the invention of the shopping cart. More than 50 years of experience with products from corn is working on your side when you specify CLINTON CORN SYRUP, CORN STARCH, REFINED CORN OIL, LACTIC ACID and CLINTOSE BRAND DEXTROSE.

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CHECKING SALES ANALYSIS REPORTS with Univac section supervisor John Hackett (left) and Tabulating Center staff member (right) is Cott Treasurer Samuel M. Woronoff. In background at right are major sections of newly-installed Univac 120 computer.

Univac Powers Firm's Modern Tabulating Center

Cott Beverage Corp. turns over more and more tasks to computers "at no greater cost." System speeds billing, boosts data efficiency, and provides valuable tools for sales analysis

FAST-GROWING Cott Beverage Corp. is keeping pace with its rapidly expanding market share by building one of the largest data processing centers in the food and beverage industry.

Early this year, Cott began a two-year timetable of changeover to electronic data processing with the addition of a Univac 120 computer that quadrupled the clerical handling power of the home office.

By the end of this period, almost everything now handled by conventional clerical methods will be the job of Cott's Tabulating Center.

While considerable data is already under EDP control, most of it is still to come. "We're just beginning to receive the benefits of this department," states Samuel M. Woronoff, treasurer of the world-wide soft drink firm headquartered in New Haven, Conn. According to Woronoff, 'We're going to build this up step-by-step, incorporating added duties into the Tabulating Center as we go along."

What is EDP accomplishing for Cott? The best way to judge benefits at this stage is to include future potentials along with present improvements. Here's a partial list of present and expected positive results:

► **Bills go out faster.** By Saturday noon, all statements for that week are in the mail.

► **Sales reports can be checked** and cross-checked for a clearcut picture of sales volumes and targets.

► **Sales analyses** can be speedily constructed for fingertip control and improvement of Cott territories.

► **Detailed record-keeping** activities can be kept on schedule without slowing for seasonal peaks.

► **Accounting department** activities such as posting, scheduling advertising allowances, payroll, etc., can be handled faster and more efficiently.

► **Warehouse stocking,** purchasing data, inventory control, and other vital areas can be keyed to speedier planning and operation despite market and seasonal fluctuations.

► **Credit-checking** can keep a watchdog eye on bad accounts and cut down the Loss on Bad Debts side of the ledger.

Began with Mission

Progressive Cott is a major soft drink name in the Eastern half of the country with company plants in the Connecticut-New York area and Cott-label franchises spreading out past Chicago. In addition, Mission of California, a wholly-owned subsidiary, markets the Mission name throughout the world. Mission's Big Giant Cola and Quiky franchise divisions make up the balance of the Cott organization.

Need for electronic data processing arose originally because of the huge task of processing Mission franchise reports. This far-flung division's sales data had required considerable time and a faster as well as more efficient technique was needed.

After the first installation of equipment in '58, Cott management began to see the variety of benefits that could be provided. Consequently, the Univac 120 computer was installed early this year to further process Mission reports and also prepare for handling all divisional paperwork.

(Turn page)

JACK L. MISCHOU
Assistant Editor, "FOOD Engineering"

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Sales analysis is just an example of the detail and information derived from the computer center's operation. Using the original invoice as a starting point, Cott headquarters has available a 12-way analysis of each territory. Data concerning gallonage and case yield is compared to the same period of time in the previous year, the previous month, etc.

This data is broken down via salesman and via each separate flavor and then cross-checked certain other ways. From this analysis, Cott executives have a ready-made and up-to-date comparison of sales efforts and can pinpoint weak spots. Trends in any area can provide valuable strategy planning tools.

Management knows immediately who's up and who's down, whether a salesman is pushing the more expensive or less expensive syrups, whether a certain territory needs special promotion and attention, etc.

Another example of Cott's use of computer power is scheduling advertising allowances for franchise bottlers. At the annual Cott bottler's convention, an up-to-date schedule is available. Detailed data that formerly required 3 months of preparation had been computed in one day.

Actually, there is much more available detail that is not yet being incorporated into Tabulating Center operations. Instead of providing detail for detail's sake, Cott makes sure that computer time is spent for worthwhile results.

Any proposal is given considerable thought before being programmed. In many instances, John Hackett, supervisor of the Univac section, presents potential applications of the computer to management. He explains what he can provide, how it can be provided, or how it might be tied into another computer operation. All aspects are considered and a final decision is made that insures against repetition of data. It must serve a useful purpose.

At Same Cost

Management knows that one of the problems of EDP is the difficulty of using a computer to its fullest capacity and that much detail would be a waste of time and money. But it also feels the computer is providing faster and more valuable information than is economically possible to achieve with conventional methods—and at "no greater cost."

Cott rents its Tabulating Center equipment from Remington for about $2,500 per month.

Heart of the Tabulating Center is the Univac 120 with its storage and output units. Initially, a Cardomatic key-punch is used to build cards, punching master data such as customer name, address, territory, etc. Other equipment includes a printer, sorter, read-out tabulators, and electronic collators which match cards for various programming purposes.

As invoices come in, information is key-punched on cards and stored. Supervisor Hackett works closely with Remington personnel in programming the Univac for processing.

Presently, the Tabulating Center occupies one room in Cott's New Haven headquarters. In time, as other jobs are taken up by the computer, physical expansion will be necessary and is already planned.

Cott's management recognizes that certain clerical jobs might be eliminated in the process. But firm also believes that the increased information provided via data processing will provide even more jobs for employees. Some members of the present computer staff formerly worked in other parts of the office.

Expand to Retail

Right now, most of the computer's time is devoted to Mission franchise data, although some other divisional tasks are also in process. According to Hackett, "When we get into our retail and wholesale areas, an even bigger job will be performed by the Tabulating Center."

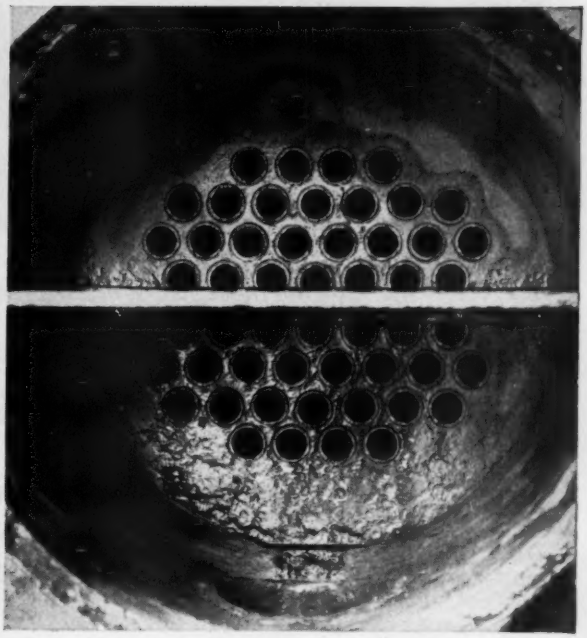
Since some 25 Cott drivers make around 20 stops per day in the New York-Connecticut area, considerable data must be fed through the computers to present a detailed picture of this operation.

By the end of the present timetable, Cott will have expanded the center's power to meet data requirements for the whole company's activities in franchise, wholesale and retail reporting.

It's obvious that Cott management is enthusiastic about this computing potential. Firm, which added 42 new franchises and posted sales of over $10 million in '60, feels it now has the necessary data processing capacity to cover an accelerated growth over the next five years. (End)

Descale equipment quickly, safely —without dismantling!

BEFORE—This condenser was badly clogged with hard-water scale. Mechanical cleaning of the tubes would have been difficult, time-consuming and costly. To use hydrochloric acid would pose danger to nearby equipment and personnel.



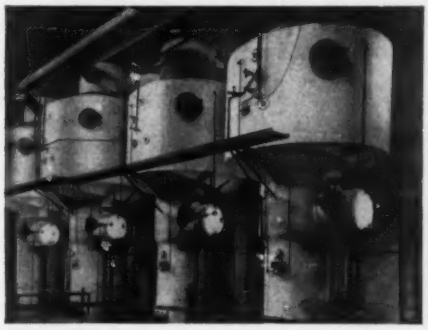
AFTER—It was easily cleaned *without dismantling* by circulating a water solution of a sulfamic acid-based cleaner for an hour. Short downtime, *no* danger to equipment and complete safety for personnel!

Use a dry-acid cleaner based on Du Pont Sulfamic Acid

They're effective. Dry-acid cleaners dissolve hard-water scale and certain food deposits found in cooking vessels, evaporators, heat exchangers, pasteurizers, etc. Yet they're much less corrosive to metal than hydrochloric-acid cleaners, particularly on stainless steel!

They're easy, safe. Just dissolve the solid cleaner in water and circulate through the equipment. Often the acid can be added dry. No danger of broken carboys, spilled liquids, or toxic fumes—glasses and gloves the only protective clothing needed!

They're economical, fast. 1 lb. of dry cleaner does the job of several lbs. of liquid acid—you save on shipping, handling, storage and downtime because there's no dismantling. You clean in place!



Food process equipment like these evaporators is easily descaled with a cleaner based on Du Pont Sulfamic Acid. No dismantling—the cleaner is circulated with the evaporator feed pumps.

Ask your supplier of maintenance cleaners for information on dry-acid cleaners, or send the coupon for booklet and names of formulators offering these products.

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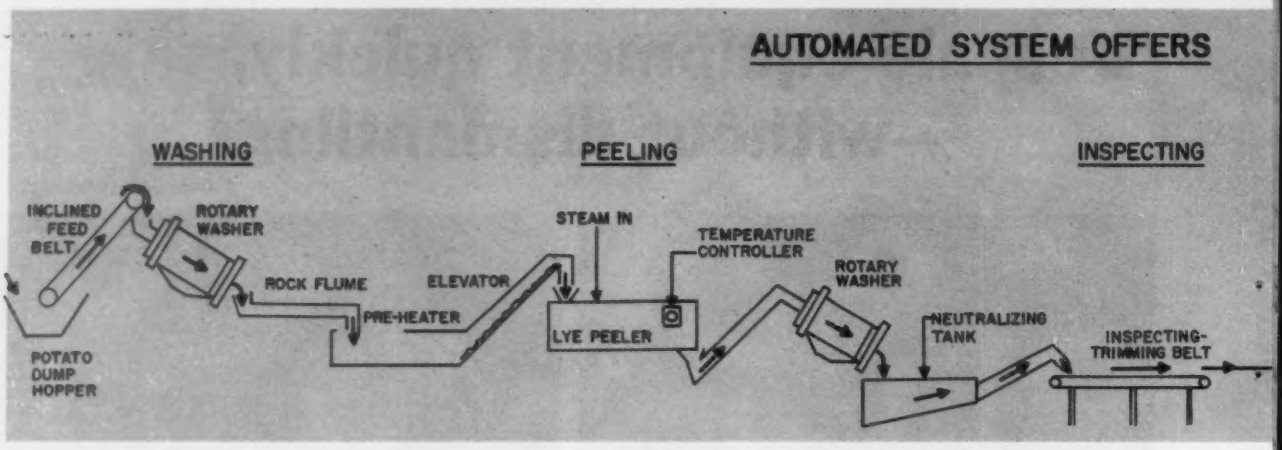


POTATOES are peeled, washed, sliced or diced, blanched, and mix-cooked with sauce or mayonnaise in straight-through line . . .

Improvised Automation Solves

Midwest packer did it by going through the headaches of raw product selection and the growing pains of switching from batch to continuous process, controlled all along the line

PIONEERING venture of Streator-Read Foods, into factory production of stable can-packed potato salad, started from an idea based on observation. It stemmed from J. L. Read's (company's founder) observation of a Milwaukee delicatessen outlet's weekly production of unpackaged potato salad in the 300,000 lb. figure—sometimes as much as 12 tons for a weekend. Result was the first volume production of potato salad by the Streator, Ill., firm—a single specialty business that's paid off.

From scratch in '53, Read ran first-year production to about 2½ million lb. in '59. Another factor that added to this volume was the introduction in '57 of glass-packed mayonnaise-style potato salad. At that time, mayonnaise-style output represented merely ¼ million lb./yr. against 7½ million lb. for German-style. However, acceptance of the mayonnaise-style has mounted to the point where, in '60, it's expected to reach about 40% of total potato salad production.

Volume potato salad production, according to Tom Sullivan (production v.-p.), triggered a hatful of headaches. Major cause—reaction of certain potato varieties to cooking. Some varieties cook too hard, others too soft. Cure—quality control, especially in selecting proper varieties and in automatically temperature-controlling their cooking within a 2-deg. F. range.

First major step toward maintaining product quality was the hiring of a food technologist who, after considerable research, set up a control program (with specifications) involving inspection of:

. . . **Potatoes as they're received,** fed to and discharged from lye peeler and blancher.

. . . **Product as it's fed** to the discharge from cooker (Reitz Thermoscrew) and pasteurizer, at filling machines and in the warehouse.

Another big headache arose from the fact that some equipment had to be company-built, available units had to be modified. But, in time, operations became more mechanized as product demand increased.

Non-Stop Flow

Operations in the present plant, that's adjustable to handle 6,000 to 7,500 lb. of potatoes/hr., are continuous. And that's not all. It's built to grow along with increases in product demand and the growth of new products.

To achieve greater output, productions are scheduled to operate a day at a time on either German- or mayonnaise-style potato salad. What's more, production's restricted to one instead of the former two shifts, because of availability of key supervisory personnel responsible for product quality control.

How this single shift has paid off:

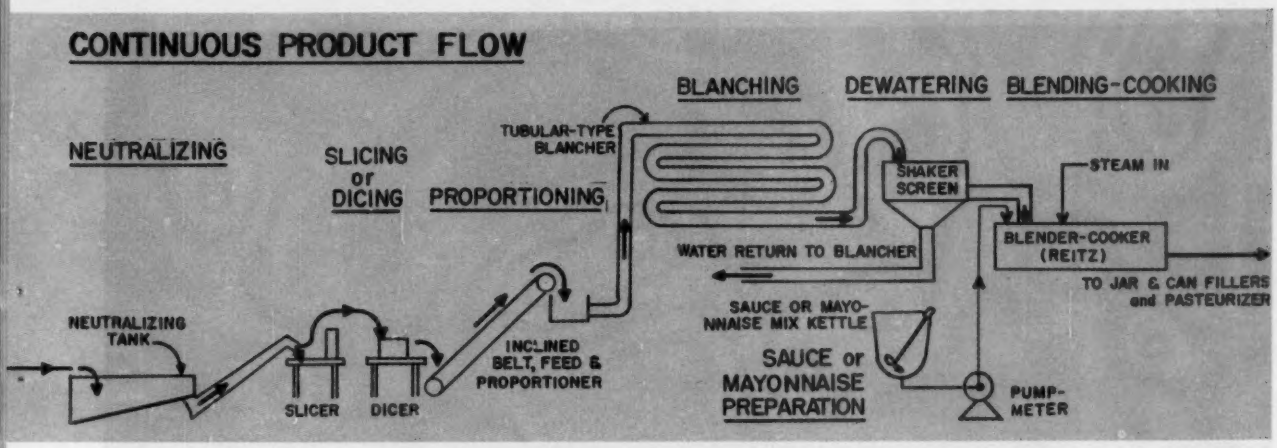
A steady rise in performance—particularly from direct-labor saving efficiency, schedule compliance, and quality. During the first year, total performance of the manufacturing division increased over 10% of standard.

Better management control. The plan has helped locate weak spots and improved them.

Sharper appraisals by foremen of their own departments in relation to others.

Livelier competition among departments of a section. Production is now rated to handle the cooking of 60,000 lb. of potatoes (15% to 20% trimming losses per shift). Finished product-output per shift amounts to 4,000 cases (a dozen 1-lb. cans per case).

JOHN V. ZIEMBA, Senior Associate, Editor, "Food Engineering," Chicago



. . . Setup is adjustable to handle from 6,000 to 7,500 lb. of product/hr. and is built to grow with increases in product demand.

New Product Production

From pallet loads, bagged potatoes are inspected as they're dumped into a floor-level hopper feeding an inclined flight conveyor discharging into a rotary-reel washer. Spuds next drop into a "rock flume" and then into a preheat tank (120-130 F.) with an inclined elevator-type conveyor discharge that feeds a steam-heated (130-160 F.) lye (15-25%)-peeling tank. Tank's equipped with an automatic temperature controller-recorder. Differences in lye temperatures and temperatures in peeler are, of course, adjusted in accordance with size and varieties of spuds being handled.

Next step is the removal of skins as potatoes are carried through a second rotary-reel washer. Lye is removed from spuds as they proceed through two neutralizing tanks on either side of the inspection conveyor. At this stage, peeled potatoes are shunted either to slicing (for German-style) or dicing (for mayonnaise-style) machines (Urschel), from which they drop onto a proportioning-type elevator (neoprene belt with measuring cleats and a star-wheel leveler operated by an eccentric vibrator). Thus, uniform product flow is maintained as sliced or diced potatoes make five passes through a tubular type (4-in. dia.) steam blancher. Travel time through temperature-controlled (225-230 F.) stainless steel blancher is 10 min.

Next, blanched potatoes are pumped into a shaker screen (Scott-Viner), where they're discharged into a 10-ft. continuous cooker (Reitz Thermoscrew), equipped with a worm-screw conveyor. Water is recovered and returned to the blancher.

To make the Reitz blender-cooker operate continuously, Streator-Read installed a new metering pump (Emulsol-Waukesha) that accurately proportions kettle-prepared sauce (for German-style) or mayonnaise. New pump meter's equipped with a variable-speed drive and tachometer controller. Blender-cooker is temperature controlled as product makes its 2-min. travel through it.

Machine-filling of products is at speeds up to 120 jars or cans/min. Mayonnaise-style product is jar-filled by a six-piston filler (Geyer), and German-style by a 24-pocket rotary filler (FMC). Jars and cans then proceed through a 6-spout, microswitch controller pre-briner (Machinery Service) with star-wheel discharge of containers to conveyor, feeding a 12x60 ft. variable-speed driven, walking-beam pasteurizer (Canco). Pasteurizer's temperature (180-195 F.) is automatically controlled during container-packed product's 70 to 105-min. travel. Temperatures and time - travel through pasteurizer are adjusted according to product and container size. Containers finally proceed through labeler and case packer before going to storage warehouse. (End)

PROPORTIONING CONTROL: Product uniformity is maintained as diced or sliced potatoes are proportioned as they're fed through blancher and blender-cooker **(A)** and sauce or mayonnaise is pump-metered into blender-cooker. Product then goes to filler **(B)**.

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Advances in Technology

Study of pH Changes in Milk During Freezing

Measurement of pH during freezing and frozen storage of pasteurized and raw milk with added calcium, phosphate, and citrate showed that marked pH changes occurred in frozen milk.

During slow freezing, the pH decreased to values as low as 5.8, whereas little change occurred during fast freezing. At −7C. and at −12C. the pH decreased to a minimum during the first 2 to 3 wk. of storage, and increased gradually thereafter.

The pH minimum of pasteurized and raw milk with added salt was 5.8-6.0, lower than that of raw milk. 6.1-6.2. Increase in pH after minimum was reached was more gradual in pasteurized and raw milk with added chemicals than in raw milk.

Although quantity of precipitated protein was measured simultaneously, the data did not indicate a definite relation between pH changes and protein precipitation. —*Jour. of Dairy Science*, 26-31, Jan. 1961.

Electronic Unit Determines Meat Lean in 3 Seconds

Requiring little sample preparation, a new electronic machine can determine accurately the percent of lean in meat within 3 sec. The meat simply is ground through a ¾-in. plate—a normal meat reduction in many sausage and canning operations.

Sampling machine uses a low X-ray level so that meat is not downgraded in any way. After determination, meat sample (13 lb.) is put back into container from which drawn.

Compared to standard chemical techniques requiring from several to 24 hr., the rapid electronic method gives results within ±1% of standard oven-drying procedure. Variances of this and greater magnitude are normal in sampling.

Equipment is manufactured and distributed by Anyl-Ray Corp. Evaluatory work was done at John Morrell & Co. plants. — *The National Provisioner*, 18-20, July 29, 1961.

VIEW shows vertical stack of cratered foam-mats in continuous dryer.

'Extractive' Foam-Mat Dryer Achieves Continuous and Automatic Drying

A pilot plant dryer, developed by Western Regional Research Laboratory, Albany, Calif., operates continuously and automatically, beginning with food at one end and yielding dry powder at the other.

A continuous foaming device meters food stabilizer and gas together, produces a foam, and delivers it to the feeder. This unit extrudes the foam onto perforated trays and punctures or craters the mat. Trays then move through the dryer proper. Filtered hot air is delivered to the dryer by the blower unit. The dry material is conveyed to the detraying unit located in a low humidity room. Detrayer plows off the product and brushes the tray clean for reuse. The powder is filled into bags by gravity while being flushed with nitrogen. Production rate is about 20 lb. orange juice powder/hr.

It's best to pack fruit powders as dry as possible to retard spoilage or caking. Because drying below 2.5% moisture can scorch the product, adding small amounts of solvents facilitates final drying. A very hydrophilic solvent equal in weight to 10% of the powder may be sprayed onto the powder without clumping. This solvent, and most of remaining water, can readily be removed at room temperature in vacuum or gentle air stream. Ethanol can be used, although methanol is faster.

This technique may also be used to remove residual moisture from freeze-dried food pieces. Further, in-package dessicants can be avoided with the help of extractive drying, since orange powders with less than 1% moisture can be achieved. — *Western Utilization R&D Div., Agricultural Research Service, U.S.D.A.*

Detection of Non-Cocoa Butter Fats in Chocolate

Four of the newer analytical techniques, gas chromatography, column chromatography, infra-red spectrophotometry, and dielectric measurements have been applied to the problem of detecting non-cocoa butter fats in chocolate.

Chromatography gave the best results, and both the gas and column methods are adapted to the detection of medium and short chain fatty acids (found only in trace quantities in genuine cocoa butter). Levels as low as 0.001 or 0.002% can be detected as the methyl esters of the fatty acids.

Infra-red spectrophotometry may be used to detect partly hydrogenated fats. The triglycerides themselves may be examined by the infra-red method.

Dielectric measurements have only limited value as the dielectric constants of many foreign fats are very similar to those of cocoa butter. These methods of estimation

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of the purity of fats are applicable in many areas other than that of cocoa butter.—*International Chocolate Review*, 157-165, April, 1961.

Fluid Shortening Shows Good Baking Properties

Through extensive development, successful fluid shortening emulsions (in water) can be prepared by using such varied base-stocks as lard, vegetable oil, or hydrogenated vegetable oil.

Baking tests, using any of the above base-stocks, yield favorable results and show improvement over plastic shortenings containing the same emulsifiers. Many of the formulations work very well in cream icings and fillings.

The most important factors in emulsion viscosity are: Mono-glyceride type; total emulsifier levels; ratio of sorbitan monostearate to polyoxyethylene sorbitan monostearate; and the base-stock used.

Bacteriological tests did show a small increase in count after 60 days of storage. But this increase is negligible. Moreover, in practice, batches do not stand unused for so long.

Further development of this concept should enable the shortening industry to make a significant contribution toward more efficient, lower-cost operation for its customers.—*Jour. of American Oil Chemists*, 306-309, June, 1961.

Glucose Diffusion During Vegetable Dehydration

In dehydrated potato and carrot strips that are scalded before drying, the center of the strips is more prone to non-enzymatic browning than the peripheral portion of the strips.

This suggests that there is a migration of sugars and amino acids to the center of the strips during drying. Such a hypothesis was tested by soaking strips of potato and carrot for 40 hr. in a solution containing glucose, randomly labeled with carbon-14, before scalding them.

Autoradiographs of such strips dried with and without scalding them showed that during drying of unscalded strips there was a concentration of glucose in the periphery of the strip. After scalding the glucose was concentrated in the central portion. The difference in the behavior of the glucose is probably the result of the difference in the form of the starch granules between scalded and unscalded strips.—*Jour. of the Science of Food & Agric.*, 490-492, June, 1961.

Commercial Feasibility for Precooked Beans Studied

Pre-freezing and high-humidity dehydration were studied in the commercial preparation of precooked dehydrated beans. A freezing step was inserted between the precooking and dehydration to overcome "butterflying" or bean splitting during drying. Because pre-freezing added extra costs, high-humidity dehydration was introduced during initial drying stages to retard rapid drying and splitting of the skin.

Several conclusions reached in studies:

1) Navy and small red beans should be blanched before soaking.

2) The high-humidity dehydration process was unacceptable.

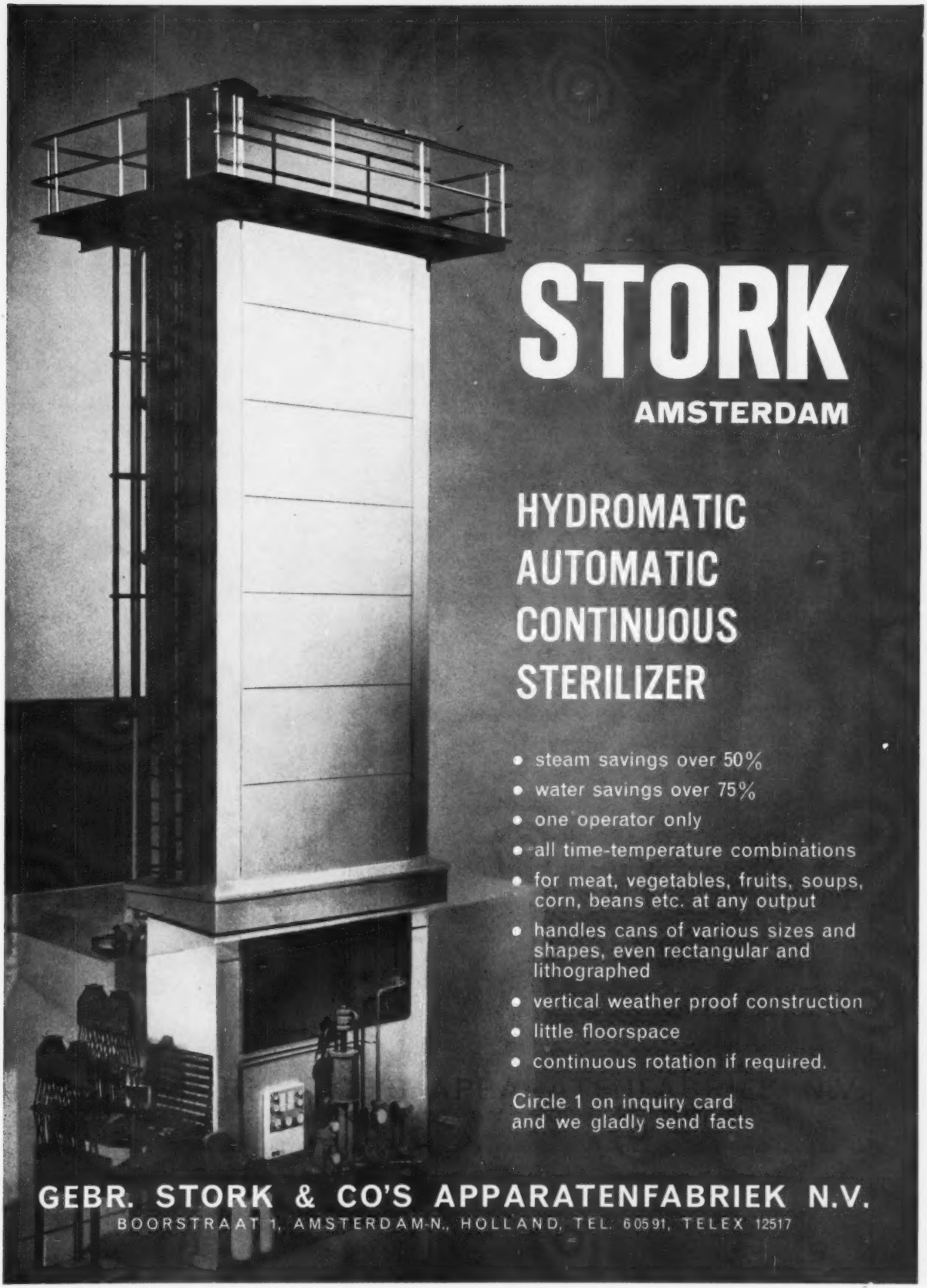
3) Production of precooked dehydrated legume vegetables by the pre-frozen technique is commercially feasible.

4) Processing cost can be greatly reduced if the complete operation, including the freezing, can be done at the dehydration plant.—*Food Technology*, 13-18, Sept. 1961.

Cultures Impart Flavor Character to Sausages

Fermented sausages of the Genoa, Lebanon Bologna, summer, and similar types get their characteristic flavor from the growth of *Lactobacilli* and *Pediococci*. A typical summer sausage of this type may be made up of one-third each trimmed cow rounds, trimmed bull rounds, and pork trimmings, seasoned with black pepper, nutmeg, and coriander. About 3% salt may be used along with 0.01% sodium nitrite.

A lyophilized culture of *Pediococcus cerevisiae* Strain FPI has been found suitable for production of these sausages. The only restriction on the sausage formulas when using the cultures is a limitation of sodium nitrite to a maximum of 0.01% (100 ppm.) and the inclusion of some glucose in the formula to promote a more rapid fermentation. It is not necessary to incubate the sausage mix at 45F. A 48-hr. smoking period is recommended.—*Applied Microbiology*, 9, No. 3, 239-243. May 1961.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Maggi's fills a long-felt need in the food industry, offering substantial savings along with its many other advantages. In beef products, for example, Maggi's Type 4-BE can replace a considerable amount of beef extract while imparting a cleaner, clearer, meatier flavor.

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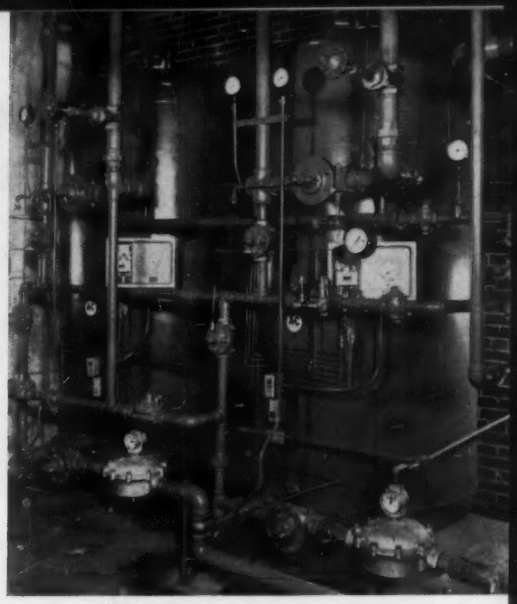

FULLY AUTOMATIC multiple valve dual sodium zeolite softeners such as this permit installation of units with lower capacity. Result is reduced equipment costs and no operator attention during regeneration.

Efficiency Checks for Water Softening Systems

Maximum performance of filtration or water softening systems is assured when following these simple maintenance procedures

SIMPLE quality filtration and sodium or hydrogen zeolite water softening systems serving small and medium sized moderate pressure plants can be expected to give years of trouble-free service.

When unsatisfactory pressure filter performance occurs, it is often due to not adhering to recommended operating procedures. However, several steps and checks can be taken to restore the system to its original efficiency.

✓ **At the first sign of increasing turbidity in the effluent,** a check should be made to determine whether the equipment is still being operated at **flow rates** within the design capacity. For simple pressure systems using either an anthracite filtering medium or sand and graded gravel, a flow rate of under 3 gal./sq. ft. of cross-sectional area per minute is the maximum permissible for satisfactory results. Higher flow rates indicate a need for additional filtration units.

✓ **Channeling short circuits water being filtered.** Where plant requirements have not outgrown filter capacity, a check should be made for possible **channeling or fouling of the filter bed.** If, after vigorous backwashing, surface of the filter media is not level upon the units being drained, channeling probably exists. Filter bed should be removed and regraded.

R. E. HINICH, Application Engineer, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

✓ **Any fouled filter media on top of a drained filter bed** should be carefully removed and discarded to a depth where foreign materials are no longer present. **Fresh filter media** should then be added to restore the bed to its proper operating level. Depth of fouling may range from 4-6 in.

Backwashing Techniques

Improper backwashing often results in faulty filtration. Excessive time between backwashes may promote channeling. It can also cause foreign material to penetrate so deeply into the filter bed that it can no longer be removed by backwashing.

Proper backwashing requires use of sufficient water. In general, filters should be backwashed with as high a flow rate of water as the system can stand without loss of filter media. Flow should be increased slowly until the full permissible rate is reached. Rapid opening of backwash valves can cause internal upheaval of the filter media ultimately resulting in "blown beds," a condition tantamount to letting air enter the backwash system. By carefully controlling the flow rate, the filter bed can be properly cleaned without loss of media or upsetting the bed itself. Backwashing should always be continued until the filter is thoroughly cleansed.

A sight glass in the backwash effluent line provides an excellent means of examining backwash results.

✓ **If an investigation of poor filter performance** shows no upset in the bed itself, it is likely that the **lower distributor or collector system is faulty.** Broken laterals or clogged areas in the collector system usually promote channeling or mounding of the filter bed. Corrective measures in this case would require repair of the underdrain system.

✓ **Addition of surface or subsurface washers** to filters that tend to become badly fouled with iron, organic debris, or algae and microbiological growths, will often improve their performance. Such washers assist in loosening the fouling materials so they can be satisfactorily removed on each backwash.

✓ **Where alum or other coagulants** are being fed to the filter system, their **feeding devices** should be carefully checked at frequent intervals. An annual physical check of the condition of the filter bed will keep the system from becoming so seriously fouled as to require major work.

Zeolite Performance

✓ **Problems associated with zeolite softening systems** usually involve either a drop-off in the **quality of water** obtained or an apparent decrease in the quantity of good water available between regenerations. Poor quality water

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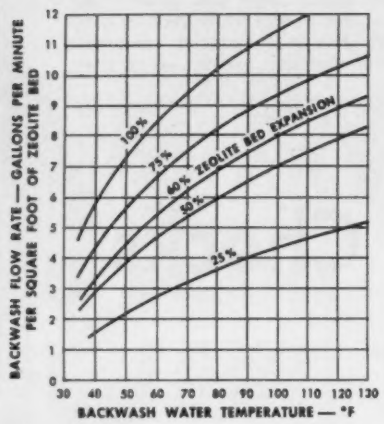


EXPANSION characteristics of a modern resin at different backwash temperatures indicate how flow rates must be modified to compensate for altered lifting ability of water.

can be caused by channeling or faulty regeneration techniques. Backwash practices to overcome channeling in pressure filters apply equally well for zeolite softeners.

✓ **Because of the much lighter density material, water temperature** plays a far more important part in backwashing zeolite softeners than filters. Backwash rates must be modified as water temperatures change to compensate for the altered lifting ability of water at various temperatures. (See graphs for bed expansion characteristics of a modern resin at different backwash water temperatures.)

A backwash rate adequate with 60F. water will not provide sufficient bed lifting and scouring at 80F., while the same flow rate at 40F. would probably lift the bed so high as to backwash zeolite material into the sewer. In effect, improper backwashing will prevent satisfactory loosening of the bed to permit close contact of zeolite particles with regenerant. Channeling, if present, causes insufficient contact between raw water and the ion exchange resin preventing complete exchange.

✓ **Both filter and ion exchange systems** should be equipped with some type of backwash **flow rate regulating device.** Where multiport valves are used, an adjustable orifice in the valve is frequently employed. Otherwise, a throttling valve should be used to properly set or adjust the backwash flow rate. A manometer or other rate indicating device and a thermometer fitted in the backwash supply line are sometimes furnished by equipment suppliers and are extremely useful in establishing required backwash flow rates.

Further Checks

A number of factors may cause a zeolite system to drop off in total capacity over a period of time.

✓ **Where there is evidence of an increase in raw water hardness,** a check should be made to determine the effect of the increase on the capacity in gallons between regenerations. This calculation may show that the equipment is operating at as high an exchange rate as originally contemplated and that an increase in hardness of the raw water is responsible for the lowered capacity of softened water.

✓ **On sodium or hydrogen zeolite systems, starvation** can be caused by using an insufficient quantity of brine or dilute acid. A salt bed of 12 in. or more is recommended to produce a saturated brine. Starvation may also result from using too much dilution water with the concentrated regenerant.

Newer ion exchange resins for application in either sodium or hydrogen zeolite softening systems are capable of performing over wide ranges of temperature, pH and other influent water characteristics. Older greensands or synthetic resins are more susceptible to high temperatures, high or low pH, intermittent chlorine residuals of more than 1 ppm., low raw water silica content, and increased flow rates than are the newer ones.

While the initial cost of older ion exchange materials may be less, their lower exchange efficiency requires higher regenerant dosages than the newer high capacity resins. This means higher operating cost, more wear and tear on equipment, more operator's time, and more frequent exposure of parts to corrosive brine solution.

✓ **Testing for accuracy every few years is a must for water meters** used as a measure of flow rate or quantities of water softened between regeneration. Should **multiport valves** leak across the face or seat of the internal parts to cause intermingling of raw water with the effluent, the leakage can be readily detected by sampling ahead of the valve to get a true test of the performance of the exchange material. To assure satisfactory performance, faulty valves should be repaired. (End)

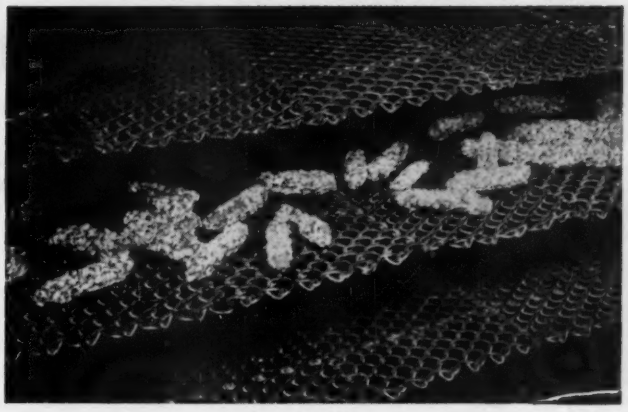
This mark tells you a product is made of modern, dependable Steel.

Want to increase your production?

Vita Food Products, Inc., New York City, is putting out three times as many maraschino cherries with a USS Cyclone Belt and some new processing machinery. And they've done it without adding more personnel! They've found there's no breaking or oxidation with the Cyclone Belt—even after steady use in a submersion-type pasteurizer.

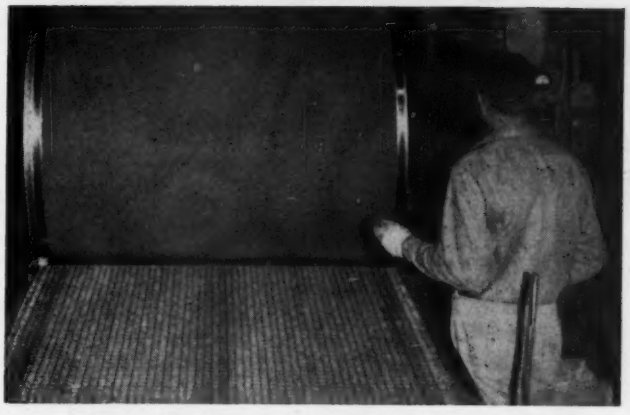
Want to stop wasting time?

Curtiss Candy Company, Chicago, Illinois, cools over 1,000,000 Baby Ruth candy bars a week on USS Cyclone Conveyor Belts—while they're making them. There was a time when they had to put the candy on trays and wait for it to cool overnight. Some of the individual belts have lasted years with a minimum of maintenance.



Want to save materials and manpower?

Ruberoid Corporation, St. Louis, Missouri, is completely sold on their Cyclone Conveyor Belt because it saves so much material and manpower in their asbestos-cement plant. They know they can depend on the belts to behave efficiently under difficult operating conditions. And they're very happy with Cyclone Belt flexibility and ease of maintenance.



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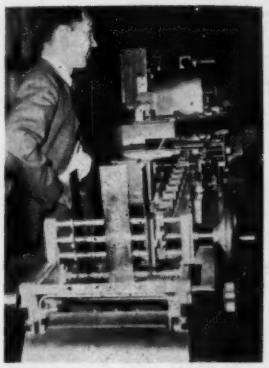
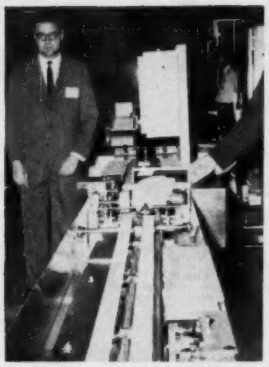
. . . as caught by FE's camera at the American Meat Institute show in Chicago

4 Advanced Packaging Machines

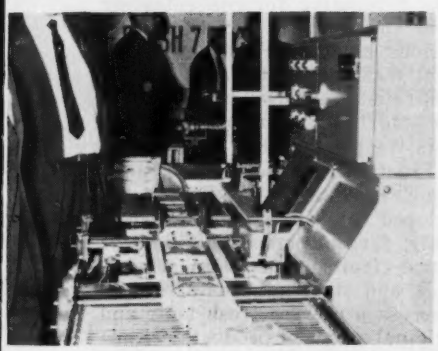


STRAIGHTLINE WRAPPER is designed for overwrapping card-stacked wieners and sliced luncheon meats in variety of heat-sealable, shrink and non-shrink type films. Rate is up to 60 packages/min. Features control panel, automatic lubing, card feed and ejector.—Crompton & Knowles Packaging Corp., Agawam, Mass. **(336)**



NEW BACON WRAPPER forms and seals new paperboard package at speeds of 60/min. Machine heat-activates adhesive coating on sides of board, passes seal areas between band sealers. Folds top flaps and seals in same manner. Machine: Bartelt Engineering Co., Rockford, Ill. **(337)**. Sliced bacon package: Riegel Paper, N. Y. C. **(338)**

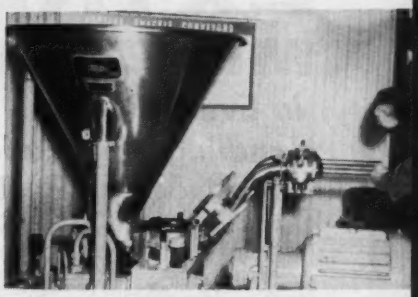
LOW-COST vacuum packaging unit seals meats in heat-sealed pouches. As sealer cycles, operator applies correct tape from dispenser. Features product-loading tray and pouch-opening blower.—International Kenfield Distributing Co., Chicago. **(339)**



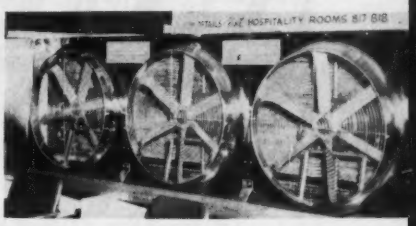
PACKAGE CHECK-WEIGHER features take-away conveyor with straight-through (for correct weights) and two lateral discharges (for overs and unders). Replaces pneumatically operated discharge gates. — The Exact Weight Scale Co., Columbus, O. **(340)**

3 New Processing Units

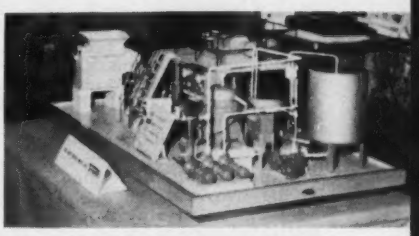
CONTINUOUS STUFFER handles meat emulsions and coarse products. Features dual-speed hydraulically-driven pump that automatically changes speed by opening-closing cocks. Eliminates electrical control devices, clutches and brakes. — The Allbright-Nell Co., Chicago. **(341)**



BLAST CHILLING UNIT chills meat products in minutes. Pressure-vacuum chill cabinets reduce cooler space required for all-night chilling of products. Gets production out same day processed. — Advanced Engineering Corp., Milwaukee. **(342)**



LOW-TEMPERATURE rendering system (model) recovers edible protein for inclusion into sausage products and better quality lard. Rates up to 8,000 lb./hr. raw fat. Ground fats pass through heat-exchanger, Sharples Super-D-Canter (for protein recovery), reheater and Super Centrifuge (lard recovery).—The Sharples Corp., Phila. **(343)**



4 Other Top-Notch Units

FLAKING MACHINE is equipped with hydraulically-operated product feed table and stainless cutting drum. Unit slices or flakes frozen meat blocks in seconds. Eliminates saw waste and grinding for sausage products.—General Machinery Corp., Sheboygan, Wis. **(344)**

COMPACT TWIST LINKER operates off meat-stuffing machine. Quickly adjustable for varying sizes. Operating speed to 250 links/min.—Barliant & Co., Chicago. **(345)**

PORTABLE container for truck or RR-car installation holds 500 lb. of CO_2. Thermostatically controlled CO_2-injector featured. System designed to replace costly mechanical refrigeration.—Cardox, Div. of Chemetron, Chicago. **(346)**

AIR ISOLATOR provides high velocity curtain of air across doorway to form shield between outside and inside air. Permits door to remain open during periods of heavy traffic.—Jamison Cold Storage Door Co., Hagerstown, Md. **(347)**

For more information, circle key numbers on Reader Inquiry Card, back of book

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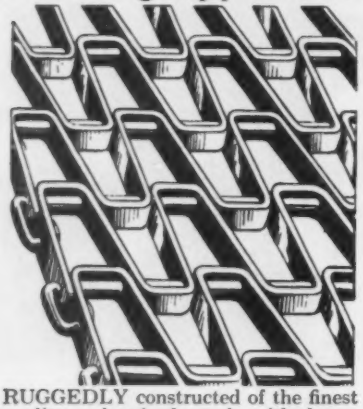

RUGGEDLY constructed of the finest quality galvanized steel, with knee-action-like flexibility, LaPorte Belts give longer wear with minimum maintenance. The open-mesh construction that flexes with every impact assures a positive drive on the LaPorte Sprocket. It also permits the free circulation of air and liquids around products in process to speed-up washing, draining, cooling, freezing, cooking, drying, dehydrating and sterilizing. In addition, LaPorte Belts provide a perfectly flat surface for all types of containers empty or filled.

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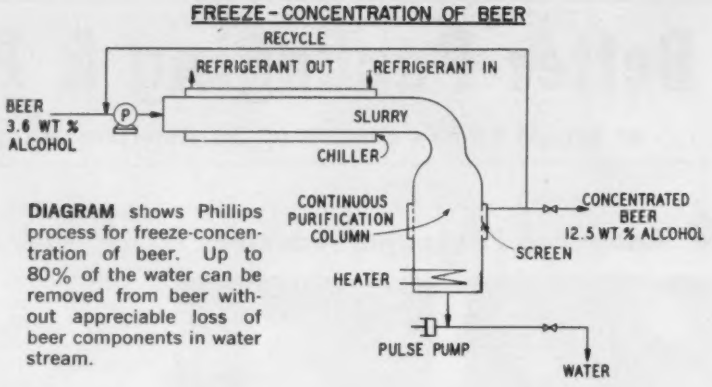


DIAGRAM shows Phillips process for freeze-concentration of beer. Up to 80% of the water can be removed from beer without appreciable loss of beer components in water stream.

Versatile and efficient processing by . . .

Freeze-Concentration

FRACTIONAL crystallization, the continuous freeze-concentration process developed by Phillips Petroleum Co., Bartlesville, Okla., is finding more application in removing water from beverages and other products. Process offers high removal efficiency, minimum maintenance, less labor, and reduced costs.

Key to process is countercurrent contacting of a crystal bed with a portion of the crystal melt. Result is thorough displacement of the occluded concentrate from the surface of the crystals with negligible dilution of concentrate. Efficiency's so high that all purification takes place in a crystal mass thickness of less than 1 in.

In freeze-concentration of beer (see drawing), up to 80% of the water can be removed with less than 0.1% by volume of beer components in the water stream. Single strength beer is blended with a recycle stream of concentrate and cooled in a crystal forming and growing unit. This produces a crystal slurry that enters the crystal purification column where non-frozen concentrate is removed through a wall filter, leaving a crystal bed. A heater melts forward surface of the bed and yields a liquid water product. Some of water exiting from melt end of column is forced back through crystal bed for "reflux." Refreezing of reflux probably occurs. About 99% of the water entering the column as crystals is removed.

Taste tests on products (beer, wine, fruit juices, vinegar and milk) so concentrated and reconstituted have been favorable. A major U. S. brewer has been licensed to conduct experiments using the Phillips process with a high capacity pilot plant scheduled for operation in Dec. 1961.

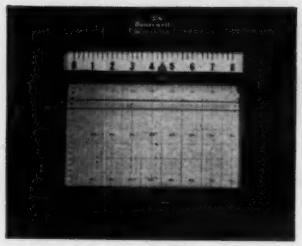
About Other Processes

Controlled crystallization of ice crystals is a technique developed by Struthers Wells Corp., N.Y.C. Produced are solid, single crystals about 1 mm. in size. These crystals are free of entrapped solids and brine when producing fresh water from saline water. They're easily separated from the concentrate or brine. Development work will begin soon on the concentration of fruit and vegetable juices.

"StepFreeze" process (FE, Oct. '51, p. 68) is now being used by Minute Maid to freeze-concentrate orange juice by removing only part of water. Patent rights are owned by Union Carbide Corp., N.Y.C., which recently proposed this processing for concentrating beer (FE, Feb. '61, p. 93). No decisions have been reached at recent Washington hearings on concentrated beer. More hearings will be held before concentrated beer gets the green light.

Fractionized freezing and thawing (FE, Aug. '54, p. 190) was developed by Dr. Adolfo Romeo, Italy, for concentrating juices of citrus fruits, musts (in wines), milk and other aqueous solutions. Process preserves fresh taste and original aroma of products. (End)

Honeywell complete food processing instrumentation



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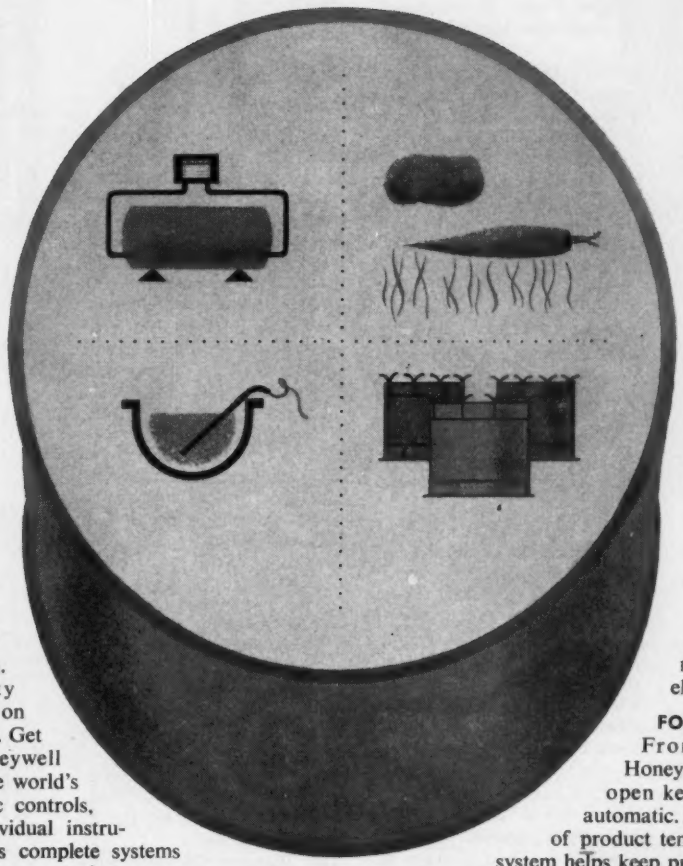
- Fast Automatic Peeling
- High-Yield Open Kettle Cooking
- Packaged Retort Control Systems



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FOR PEELING. By closely controlling process variables such as temperature and solution concentration, Honeywell peeler control systems reduce process costs and eliminate product waste.

FOR OPEN KETTLE COOKING. From filling to draining, Honeywell control systems make open kettle cooking completely automatic. Also, the accurate control of product temperature provided by the system helps keep product yield high.

FOR HORIZONTAL AND VERTICAL RETORTS. Honeywell's approach to retort instrumentation is characterized by simplicity and low cost. By offering a number of packaged control systems using the same basic instruments, Honeywell simplifies the development and altering of automatic retort systems.

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Men & Companies

Personnel

Robert J. Foley takes over as assistant to the president of Grocery Manufacturers of America.

Thomas J. Wood, v.-p. and director of Procter & Gamble, retired after 42 yrs. service.

Keith A. Gittere, who served with Borden Foods' International Div. in Holland since '54, returns to NYC headquarters as assistant v.-p.

George A. Callard has been appointed national manager of Coca-Cola's fountain sales.

William D. Randolph, manager of Hunt Foods' Legal Div., moves up to v.-p.

Oscar G. Mayer, Jr., president of Oscar Mayer & Co., takes over as board chairman of American Meat Institute.

Daniel J. Uhrig has been re-elected board chairman of American Institute of Baking.

Al de Lia has been appointed general manager of Wagner Baking's Frozen Food Div.

Robert L. Klein assumes managership of Durkee Famous Foods' Chicago Div.

H. R. Galbraith, personnel manager of Pillsbury's Consumer Divs., has been elected to the board of Pillsbury Canada, Ltd.

James L. Rankin, president of Foremost Dairies, has been named a director of American Institute of Baking—the first director ever elected from the dairy industry.

Jack F. Kofoed moves up to product marketing manager of Diamond Crystal Salt Co.

Dr. Arthur S. Wendt assumes post as v.-p. of Fred Fear Co.

Harry R. Mathis, v.-p. of Libby, McNeill & Libby, takes over as general manager and marketing officer of the Eastern Div. He will be succeeded in his former post as marketing officer of Frozen Foods Div. by recently elected v.-p. **David V. Whitley.**

A. William Bullock joins Pepsi-Cola Co. as manager of wage & salary administration.

Littleton W. Johnson joins Dulany Foods as manager of production and research.

Edward O. Boyer plans to retire from post as board member and executive v.-p. of General Mills.

Dr. Melvin L. Levine moves up to v.-p. of Dole Corp.

Alvin J. Ferro takes over as sales director of Minute Maid's New Products Div.

Jerre Pearson has been elected president of Southern Frozen Foods, Montezuma, Ga.

Miss Muriel F. Siebert and **Frank W. Norris** have been elected to the board of Rudd-Melikian, Inc.

James L. Dutt assumes post as manager of Himes Bros., Dairy Div. of Beatrice Foods.

Malcolm A. Ellison, director of produce for Super Valu Stores, has been elected president of Produce Packaging Assn.

A. Z. Kouri, former executive v.-p. of General Mills, has been named to the board of Food Corp. of America.

J. Ferris Brogan moves up to director of advertising and promotion for Borden Foods' International Div.

Donald H. Robinson, overseas operations v.-p. of Procter & Gamble, has received board membership.

Robert C. Brinsmaid takes over as advertising manager for ready-to-eat cereals at Quaker Oats. **Lawrence C. Baker** is new trade promotion manager.

William J. McGorry is new product manager of Marketing Div. of H. J. Heinz Co.

Maurice J. Ship moves into the newly created position of assistant to the v.-p. administrative planning, at Campbell Soup.

Jack P. Jordan has been elected president of Pepsi-Cola Bottling Co. of Long Island.

Industry

The Frito Co. approved plans for merger with **H. W. Lay & Co.** In consolidation of the two snack and convenience food manufacturing firms, the company will change its corporate name to **Frito-Lay Inc.** Executive officers of the new firm are: **John D. Williamson**, board chairman and chief executive officer; and **Herman W. Lay**, president.

Wilson & Co. announces that its British subsidiary, Wilson Meats Ltd., has acquired ownership of recently constructed **Princess Risborough** poultry packing plant in Loosley Row, Bucks, England.

Miller Brewing Co. plans a $7 million modernization and automation program at its Milwaukee brewery.

Pet Milk and **R. E. Funsten Co.**, nation's largest producer of pecan nuts, have approved plans for Funsten's acquisition by Pet.

The Wander Co. has purchased **The Julep Co.**, manufacturer of beverage flavors and food specialties.

Lane Foods Inc., a new firm with offices in Denver, plans to feature a line of convenience foods — salad dressings, barbecue sauce, spaghetti sauce, and frozen convenience pastries and entrees.

Dulany Foods Inc. has been acquired by a new corporation, **Dulany Industries Inc.**, organized by a group of investors headed by Louis L. Smith, NYC industrialist.

A. Michaud Co. and **Penn Valley Foods**, both of Philadelphia, have consolidated, making this combine the largest producers of portion control meats in the east.

General Foods' Mexican subsidiary, Industrial Fenix, S.A. de C.V., acquired **Rosa Blanca, S.A.**, Mexico City producer of dry soup base mixes sold under "Rosa Blanca" brand name.

Consolidated Foods Corp. has contracted to sell its cold storage plant and warehouse in Cambridge, Md. to **Bumble Bee Seafoods Inc.**

Green Giant Co. plans to establish a single line can manufacturing plant at Ripon, Wis. to serve its canneries in Wis. and Ill.

Associated Industries

The DAY Co. and **Hart-Carter Co.** have approved a proposed merger of the two firms.

Heyden Chemical Div. of Heyden Newport Chemical Corp. has appointed **Arthur Minich** president.

Crompton & Knowles Corp. has acquired **Vol-Pak Inc.**, manufacturer of modular pouch packaging machines. C&K has also concluded a "technical partnership" agreement with **Clavell, Bate & Nephews Ltd.** of Nelson, Lancashire, England, a leading British machinery manufacturer.

Borg-Warner's board chairman, **Roy C. Ingersoll**, has retired after 53 yrs. service.

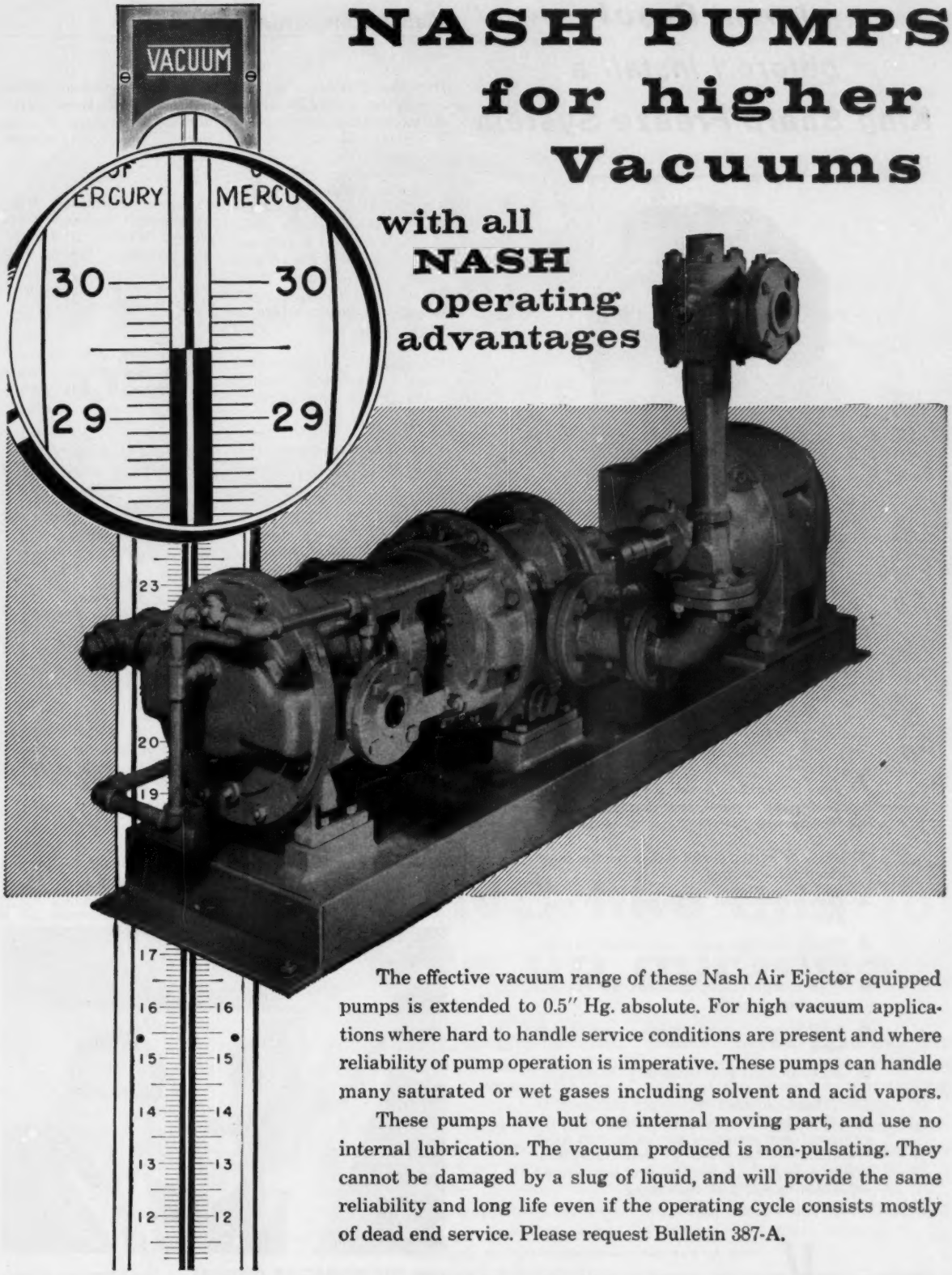
Lily-Tulip Cup Corp. has named **John P. Grady** to newly created post of sales v.-p.

The Griffith Laboratories, Union, N. J., intends expansion of its services and products available to the baking industry.

(Continued on page 102)

NASH PUMPS for higher Vacuums

with all NASH operating advantages



The effective vacuum range of these Nash Air Ejector equipped pumps is extended to 0.5″ Hg. absolute. For high vacuum applications where hard to handle service conditions are present and where reliability of pump operation is imperative. These pumps can handle many saturated or wet gases including solvent and acid vapors.

These pumps have but one internal moving part, and use no internal lubrication. The vacuum produced is non-pulsating. They cannot be damaged by a slug of liquid, and will provide the same reliability and long life even if the operating cycle consists mostly of dead end service. Please request Bulletin 387-A.

NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

I want ***Proof***

before I install a

King Sharp Freeze System

A good buyer should ask for *and get* proof before buying—proof that his blast freezing facility will give:

1. 100% or better performance on the manufacturer's ratings
2. more economical operation than other known makes
3. simple maintenance, convenient service, long life
4. even temperature, efficient air circulation, fast freezing
5. flexible installation—inside or out of cold room
6. unconditional guarantee of performance

The King Company can supply this proof to any doubting Thomas and back it up with an unmatched record of service in cold room systems, to thousands of manufacturers. Write today. 50 years of problem-solving experience is yours for the asking.

Write for free technical bulletin

SHARP FREEZE SYSTEMS

King COMPANY OF OWATONNA

905 N. Cedar St., Owatonna, Minn.

Men & Companies (continued)

Hercules Powder Co. has completed construction of its multimillion pound polypropylene fibre plant in Covington, Va.

Foremost Dairies' new Industrial Div., a consolidation of three former divisions—Western Condensing, Manufactured Product Sales, and California Manufacturing District, has established headquarters in Burlingame, Calif.

Milprint Inc. has appointed **Thad A. Gutowski** industry manager for meat packaging.

Vulcan Containers Inc. plans construction of a new plant in Vulcan Industrial Park, Hillside, Ill.

American Can Co. technicians have contributed to construction of Colombia's first modern high-speed can-making factory — **Envases Colombianos, S.A.**, located on the Caribbean port city of Barranquilla.

Container Corp. of America has begun construction of one of the world's largest folding carton plants at Carol Stream, Ill.

Brockway Glass Co., Brockway, Pa., and **The Consumers Glass Co. Ltd.**, Canada's largest glass container manufacturer, have entered into an agreement to exchange technical information. **F. B. Hess**, president of Brockway, is joining the board of Consumers Glass.

Packaging Machinery Manufacturers Institute has elected **William R. Huguenin president.** Mr. Huguenin is division manager, Packaging Machinery Div., Food Machinery Corp.

Rap-In-Wax Co. has officially changed its corporate name to Rap Industries Inc.

The Mead Corp. has reached agreement for acquisition of **Waterloo Container Corp.** and **Waterloo Corrugated Box Co.**, Waterloo, Ia., and **Fort Dodge Container Corp.**, Fort Dodge, Ia.

DuPont de Nemours & Co. plans to double capacity of its polyethylene film plant in Richmond, Va. This will bring total production to more than 60 million pounds per year.

Alonzo B. Knight has been elected president of Borg-Warner International Corp.

Deaths

Charles A. Kolb, 66, former v.-p. of General Foods Corp.

TWO TOP RE-ELECTED OFFICERS of the American Bakers Assn. confer as the '61 Baking Industry Exposition opens in Atlantic City. They are E. E. Kelley Jr. (left), Butter Krust Bakeries, Lakeland, Fla., president of ABA, and John C. Koetting, Rainbo Baking Co., Houston, Tex., chairman of ABA.

Over 700,000 miles without major overhaul. The performance of this veteran B model Mack is another demonstration of the kind of stamina built into every Mack truck and tractor.

REEFER RUNS like this pile up mileage

"We've got over 700,000 miles on one of our Macks and it's never been torn down," says L. J. Yunkers, president of Pearl Packing Company. His firm uses Mack Thermodyne® diesels exclusively on the 1500-mile round trip runs from its Madison, Indiana headquarters to a delivery point in New York City . . . puts a good 100,000 miles a year on each of its trucks.

If maintenance, repairs and fuel costs keep driving down your profits you might consider this . . . Pearl Packing Company's top-traveled 700,000-mile Mack is still averaging a healthy 6.8 miles per gallon, while repairs and routine maintenance for the 7½ years it's been working comes to little more than a half cent a mile.

Performance records like this point up one of the principal reasons for the world-wide acceptance of Mack trucks—their amazing economy . . . not just when new, but long after other trucks have outlived their usefulness. A Mack truck can do this because it is a true quality vehicle . . . *Mack built* . . . not just assembled with parts from a number of different manufacturers. Mack manufactures its own engines, carriers, transmissions, axles, cabs and other major components. And every major component is built by Mack for Mack trucks alone.

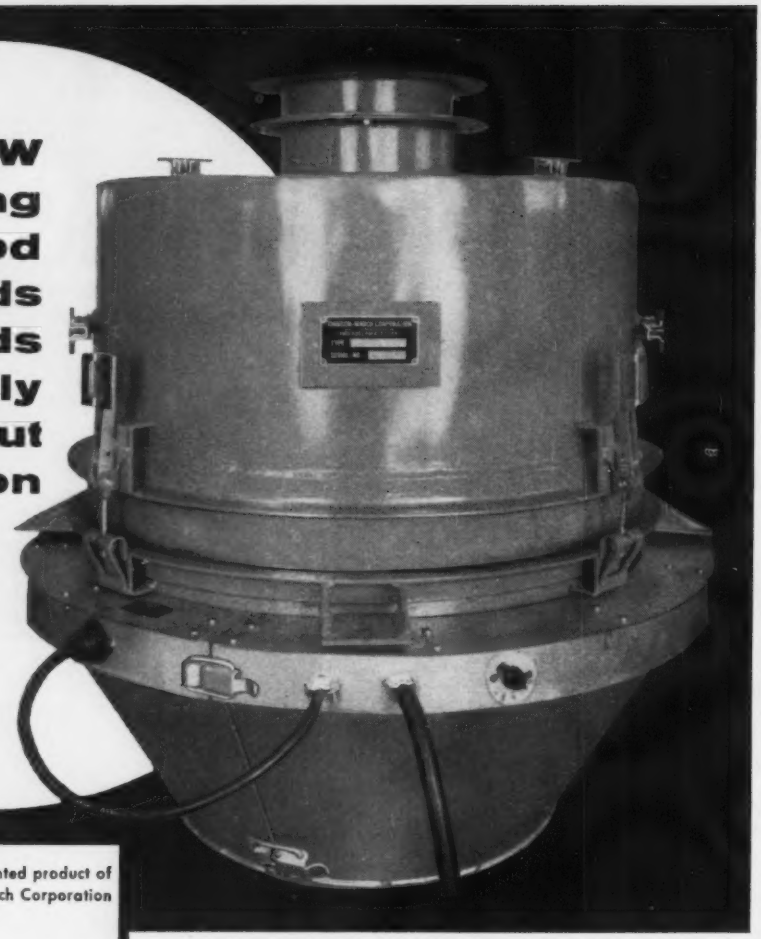
It goes without saying that the quality Mack builds into every truck can make a profitable difference in your operating costs. Mack trucks not only give you dependable performance but will lower your maintenance costs . . . eliminate down-time problems before they start and give you the truck service you need for a better operating picture. The Mack branch or distributor nearest you has complete details on the Mack model best suited to your requirements. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario. 8470

MACK
FIRST NAME FOR
TRUCKS

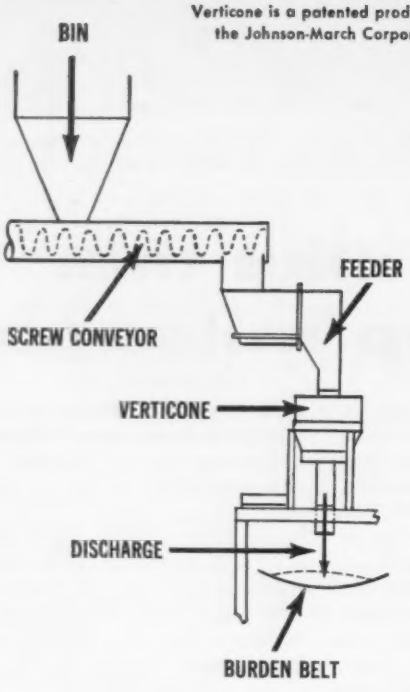
MACK for over 8 straight years NO. 1 by far in sales of diesel trucks

CIRCLE 103 ON INQUIRY CARD

NEW processing method to add liquids to solids continuously without degradation



Verticone is a patented product of the Johnson-March Corporation



TYPICAL LAYOUT FOR FOOD INDUSTRY APPLICATION VERTICONE CONDITIONER

VERTICONE® CONDITIONER coats or impregnates particles, granules or powders continuously and uniformly without degradation.

• Ideal for pressure and moisture sensitive materials • Permits change from batch to continuous process operation • Available in capacities from *300 lbs.* per hour to *150 tons* per hour

IN THE FOOD INDUSTRY Some of the food industry applications in which Verticone has demonstrated its efficiency are: moisture in grain processing, aromatic oils to instant coffee, animal fats and syrups to dog food, protein extracts to animal feed, coloring and flavors to sugar, color to salt, liquids to cereals.

The services of Johnson-March engineers and the new Johnson-March test center are available to help solve your material conditioning problems. Write today for information on Verticone and tell us about your problem in the application of liquids to solids.

JOHNSON MARCH

3018 Market Street
Philadelphia 4, Pa.

new equipment & supplies

Versatile Centrifuge

Handling up to 18,000 gph., this continuous-discharge centrifuge is available as a clarifier to remove solids and sediment from a liquid, or as a purifier to separate light and heavy liquid and solid phases.

Known as Model B214, it has a heavy-duty frame, and stainless-steel discharge cover, bowl, and disks. Bowl diameter is 24 in., speed is 4,100 rpm. Minimum power requirement, depending on feed characteristics, is 15 hp. Unit is supplied with either direct motor drive or clutch drive by standard foot-mounted motor.—*De Laval Separator Co., Poughkeepsie, N. Y.*

Circle 401 On Inquiry Card

Multi-Purpose Truck

Compact and versatile, this electric fork truck simplifies working in confined areas, such as grocery warehouses and boxcars.

With its 33¾-in. width and 68-in. mast height, unit (RST-20) can enter low doorways or trucks. In storage areas, it can stack loads 105 in. high. Three models are available with capacities of 2,000, 2,500 and 3,000 lb.

For maneuverability, the 3-wheel truck turns at right angle to the load, which saves up to 5 in. of aisle space. For greater operator comfort and ease of operation, truck has foot-operated controls for lift, tilt, travel, and braking.—*Automatic Transportation Co., 149 W. 87th St., Chicago.*

Circle 403 On Inquiry Card

Improves Frozen-Food Monitor

Smaller, less costly, and easier to activate than maker's original time-temperature indicator (FE Apr. '61, p. 100) this electrochemical device also monitors the quality of frozen foods.

Similar in operation to the former unit, the new model measures and integrates time and temperature, and shows the combined information on an easily read scale. Two versions are available—one that operates for 1 yr. at zero F., and one that functions for 8 days at zero.

The 8-day model meets the needs of frozen-food truckers making deliveries to restaurants and in other applications where long-term monitoring is not necessary.

Both versions are priced from 25-50c. each, depending on quantity ordered. Indicator is enclosed in a thin plastic case 1¾ in. long, ¾ in. wide, and 3/16 in. deep. It weighs less than 1 oz., has no moving parts, and requires no external wiring or power source. — *Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.*

Circle 402 On Inquiry Card

Nylon Pressure Tubing

Pressure tubing of nylon offers a light, strong, flexible material which is easily installed. Its flexibility eliminates pre-bending and need for flexible couplings or intermediate fittings.

Called 9056, it withstands temperatures from —40 to 185F. and resists most corrosive agents. It is recommended as a lower-cost replacement for seamless copper, ex-

(Turn page)

SERVICE CENTER

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truded aluminum, and seamless steel tubing in hydraulic-pneumatic service.

Tubing is available in sizes from ⅛-½ in.—*Garlock Inc., Palmyra, N. J.*

Circle 404 On Inquiry Card

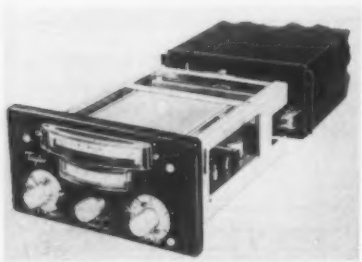
High-Speed Mixer

This unit offers efficient high-speed mixing of heavy or light powders, granules, liquids, or paste-like materials.

Called Artofex VT-40, it is engineered for complete mixing action. Various types of blades, designed for quick change, are available for every kind of mixing.

The 150-gal.-capacity bowl may be simple or double-jacketed for steam or water cooling. Unit is available in tinned or stainless steel, and locks-in on mixer's platform. Cover is an integral part of mixer and it tilts for easy blade change or bowl removals.—*Excelsior Industrial Corp., Fairview, N. J.*

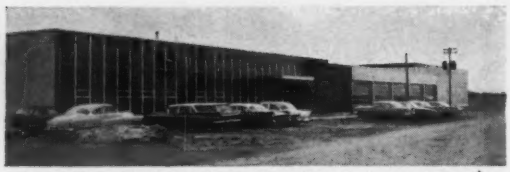
Circle 405 On Inquiry Card



Compact Control Station Offers Many Benefits

This electronic indicating - control station, for 24-v. and 1-v. systems, offers large, full - scale process indication, complete manual power supply, and compact design for panel mounting. In addition, chassis may be partially removed

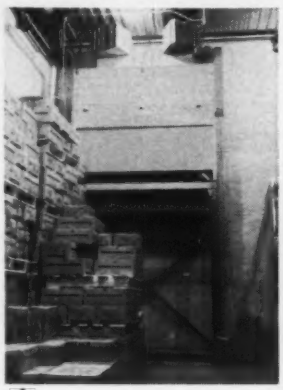
If it's Refrigerated here—



▲ **IGA-Copps Warehouse** at Stevens Point, Wisconsin, houses a total area of 93,920 sq. ft. Of this, eight rooms, 18,440 sq. ft., is freezer and cooler space necessary to hold the large quantities of perishable items the Copps Company distributes to its many IGA affiliates.

▲ **Cheese Room** is one of six coolers in warehouse using Vilter Zer-O-Disc fin coils to maintain the desired temperature levels. This cooler has 3,170 sq. ft. of fin surface to hold room at 45° F.

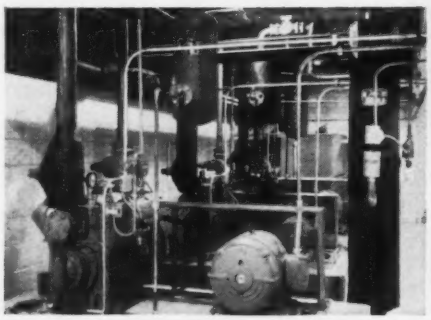
▲ **Meat Cooler** is the largest cooler in the warehouse, a small portion of which is shown. 475 head of beef or a maximum capacity of 270,000 lbs. of meat can be stored here. 17,200 sq. ft. of Vilter Zer-O-Disc fin coils hold room at 34° F.



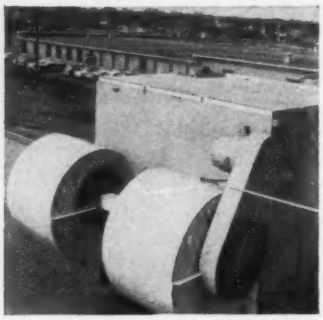
▲ **Freezer**—A Vilter automatic water defrost air unit maintains the freezer at −10° F. Two railroad cars of frozen foods can be held in the room.

▼ **Coding Room**—Vilter Zer-O-Disc fin coils hold temperature at 50° F.

It's Refrigerated by Vilter



▲ **Vilter Compressors**—Three Vilter R-22 VMC compressors supply the refrigeration requirements of the Copps Company warehouse. The 2-cylinder booster unit used on the freezer is installed between the two 4-cylinder high stage compressors.



▲ **Evaporative Condenser**—This Vilter VXF-150 evaporative condenser provides added efficiency in the condensing of refrigerant by operating without water during Winter and at low load conditions in Summer.

Vilter® refrigeration air conditioning

Vilter Manufacturing Corporation
Milwaukee 7, Wisconsin

Air Units • Ammonia and Freon Compressors • Two-Stage and Booster Compressors • Water and Brine Coolers • Blast Freezers Evaporative and Shell and Tube Condensers • Pipe Coils Valves and Fittings • Pakice and Polarflake Ice Machines Liquid Transfer Systems Air Agitated Ice Builders

Write for your copy of helpful Bulletins 820, 932 and 018.
Vilter Manufacturing Corporation, Dept. E61-2
2217 South First Street
Milwaukee 7, Wisconsin

CIRCLE 106 ON INQUIRY CARD

Refrigeration Fashioned to Every Product at Copps Company with Vilter

Operating from one of the most modern warehouses in Wisconsin is the Copps Company, distributor to many IGA affiliates in Central and Northern Wisconsin. Because of its dependability, efficient performance, and economical operation an all-Vilter refrigeration system was selected to maintain the various temperatures required to hold the large volume of perishable items and frozen foods which pass through this warehouse. Refrigerated rooms include: packing room, meat cooler, cheese room, dry cooler, wet cooler, coding room, freezer and banana rooms.

Major Vilter equipment includes two 4-cylinder high stage VMC compressors, a 2-cylinder VMC booster compressor, a VXF-150 evaporative condenser, Zer-O-Disc fin coils for all the coolers and a water defrost air unit for the freezer.

The R-22, two-stage system operates with three separate suction temperature levels: −25° F. for the freezer, 20° F. for the meat cooler and packing room and 30° F. for the remaining coolers and banana rooms.

Over 3,800 lineal feet of Vilter Zer-O-Disc fin coils are used in the coolers with sufficient fin coil installed so that one bank can be automatically defrosting at all times. These coils produce slow, even, positive air circulation naturally by convection . . . flood the room with cold . . . no "dead" spots.

Vilter refrigeration equipment does its job well with efficient performance, low maintenance and long life—all resulting in good value for your investment dollar. Rely on Vilter's ninety-plus years of experience and write today for helpful counsel on your refrigeration problems.

Installed by Vilter Distributor, Butterfield Refrigeration, Wausau, Wisconsin

Vilter Manufacturing Corporation
Milwaukee 7, Wisconsin

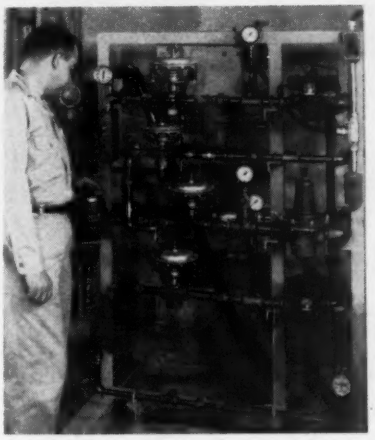
Vilter® refrigeration air conditioning

from its case while still on control for inspection or maintenance.

In the 701K series, a 3-in. process meter and a 2-in. output meter are centered on the front panel for easy viewing. Calibration of both meters is based on 1-5 ma. d.c. A multi-position switch permits either automatic or manual control modes, also provides balancing of controller's operational amplifier. Fourth position of the switch allows adjustments for bumpless transfer from automatic to manual control.

Optional features: 1% process indication meter (2% is standard), control-point detection for switching from manual to automatic control with no change in output, provision for cascade service, and a manual loading station only.—*Taylor Instrument Co., Rochester, N. Y.*

Circle 406 On Inquiry Card



Versatile Starch Cooker

This automatic starch cooker permits continuous or intermittent operation by pushbutton. It pastes starch granules either partially or completely, also provides continuity of colloidal properties when operating on an intermittent basis.

Unit's automatic features offer uniform cooking and control of dilution water and final composition. Basic cooker elements consist of a steam line, slurry line, and tangential injection heater. Latter injects steam directly into the moving slurry for instantaneous gelatinization.

System is controlled by automatic compressed air valves which start and stop the flow of water, steam, starch slurry, chemicals and additives. Tied in with a bulk-handling and slurry-preparation system, cooker can automate starch handling—from unloading to point of use. And compact unit occupies only 6 sq. ft. of floor space.—*Corn Products Sales Co., New York City.*

Circle 407 On Inquiry Card

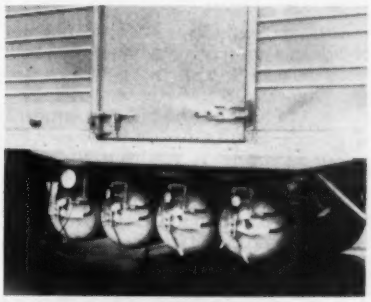
Curbs Refrigeration Loss

Equipped with this air-isolation curtain, cold-storage-room doors reportedly may remain open for prolonged periods with negligble rise in room temperature.

Called "Minveil," curtain eliminates cold air escape and pervents warm air from entering by directing a stream of air over the face of an open doorway. The stream has sufficient velocity to trap air in its immediate vicinity. Moreover, it repels insects, dust, and odors.

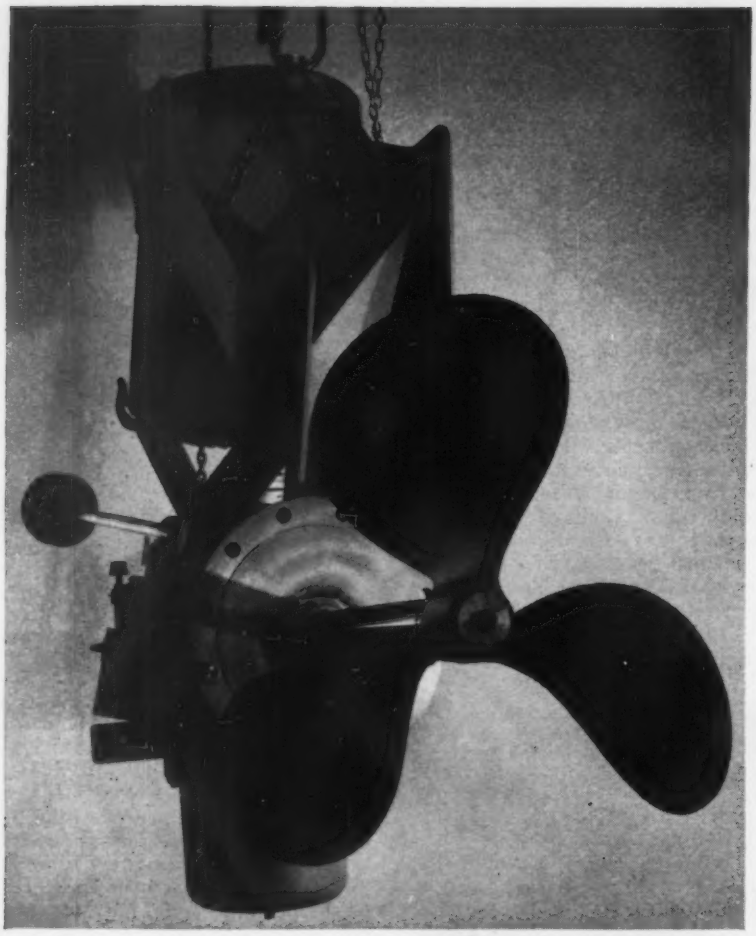
Made of aluminum, unit is easily installed outside and above doorway, thus is out of the way. It operates on 110 or 220v. a.c.—*Dyfoam Corp., New Castle, Pa.*

Circle 408 On Inquiry Card



Liquid CO_2 System For Truck Cooling

A new liquid carbon dioxide refrigeration system for truck and truck trailer bodies offers increased reliability and far lower tempera-



Now... mix or blend big tanks with less installed power

This side-entering mixer will deliver up to 50% more fluid flow per horsepower.

It's one of the new series of LIGHTNIN Side Entering Mixers—a Hi-Flo line especially designed to handle the big jobs economically.

These mixers give you extra pumping capacity. More usable *blending* and *mixing power* for every unit of power input. You save on power load, on hookup, on installation costs . . . yet you get the same—*or better*—results.

For example: if you're now using 15, 20, or 25 hp to blend a tank, *you can do the same job in the same time* with a LIGHTNIN Side Entering Mixer rated at 10, 15, or 20 hp, respectively. That's a saving of 5 hp—lets you operate more mixers without increasing your plant load capacity.

Get details now. You get economy and performance like this only with new LIGHTNIN Side Entering Mixers: the hollow quill NSE Series with independent shaft support; the new RSE Series with mixer shaft directly connected to speed reducer; and the V-belt driven VSE Series.

For details, call your LIGHTNIN Mixer representative.

He's listed in Thomas' Register and in the yellow pages of your telephone book. Or write directly to us for Bulletin 526.

Lightnin® Mixers

MIXCO fluid mixing specialists

MIXING EQUIPMENT CO., Inc., 143-m Mt. Read Blvd., Rochester 3, N.Y.

In Canada: Greey Mixing Equipment Ltd., 100 Miranda Avenue, Toronto 19, Ont.
In Europe: Lightnin Mixers Ltd., Poynton, Cheshire, England

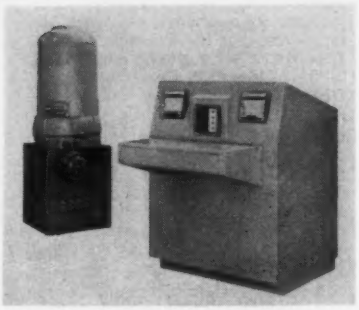
tures than are now available with mechanical units.

Considered especially promising for piggy-back operations and in transportation of frozen foods, system has no moving parts, thus chances of breakdown are reduced. In operation, carbon dioxide is carried in tanks suspended under the truck body and piped directly to the truck's interior. The liquid can provide temperatures down to —60 F. or lower.

Tests on a 38-ft. aluminum trailer have shown that four tanks can maintain —10 F. for 24 hr. Extra vessels can be mounted on flat cars to extend operational time during piggy-back movements.

Truck temperatures can be pulled down at the rate of about 1 deg. per min., and there are indications the technique will reduce moisture content in the container.—*Chemetron Corp., Cardex Div., Chicago.*

Circle 409 On Inquiry Card



Chromatographic Unit For Process Control

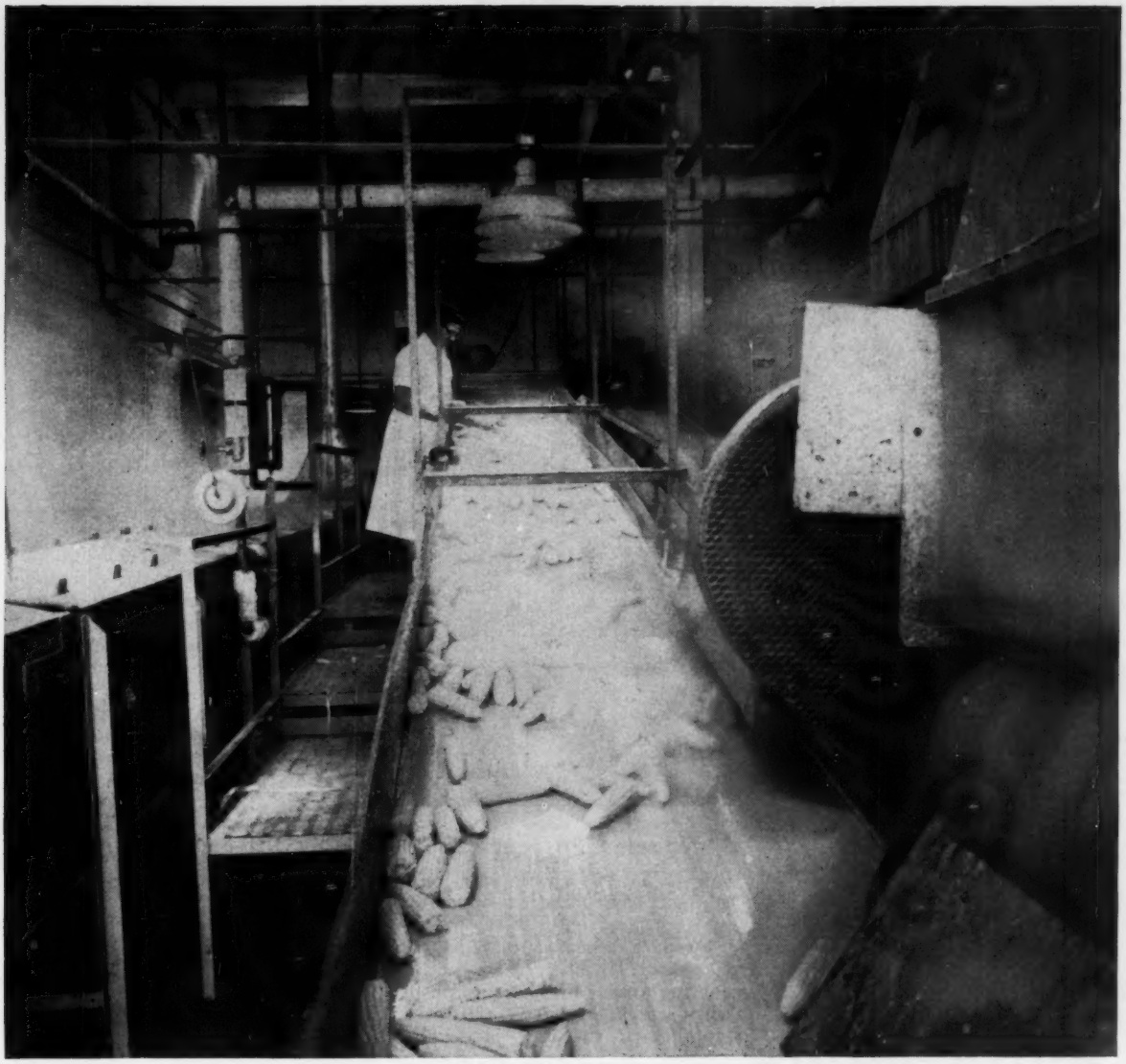
Automatic control of process-stream composition is offered by this chromatographic analyzer, which measures up to six stream components.

Continuous measurement trends are monitored by two pneumatic recorders, each logging the concentration of three components. Sharp peak definition is achieved largely through use of a sampling valve which delivers a uniform slug of sample gas to the column. An annular slide is spring loaded to prevent carrier gas from leaking into the sample.

Columns are U-shaped with 30 U-tubes divided into two crescents of 15 tubes each. Easy to pack, clean and repack, they can be field connected to produce any column arrangement up to 40 ft.

All timing functions are initiated

(Continued on page 110)



Bacteria belted out of business

B.F.Goodrich "Green Pack" belt resists moisture, mold, fungi

THE fact that the corn is so wet from washing and blanching caused trouble when fabric conveyor belts were used in this cannery. Water soaking into the belts weakened and rotted the fabric. They had to be scrubbed frequently with brushes to prevent the build-up of starch, and the multiplication of bacteria.

Then B.F.Goodrich introduced a new, improved belt, called "Green Pack", developed especially for canneries. It's made with a special rubber compound containing an inhibitor that resists most fungi and molds. It has excellent resistance to moisture absorption—3 times better than regular belts—because all plies of fabric in the belt are treated with BFG's exclusive "Hydroseal" process.

The "Green Pack" belt was tested for bacteria resistance in the cannery's laboratory, then installed in the corn-handling system. It solved the bacteria problem, and at a cost less than the belt it replaced. Since then, nearly a thousand feet of this belt have been added to help speed the processing of 11 million pounds of corn a season.

Because it's so much easier to clean, the cannery also saves 24 manhours a week per belt in scrubbing time. Corn grading is now easier, more accurate, because the gradations in shades of yellow stand out clearly on the belt's light green color.

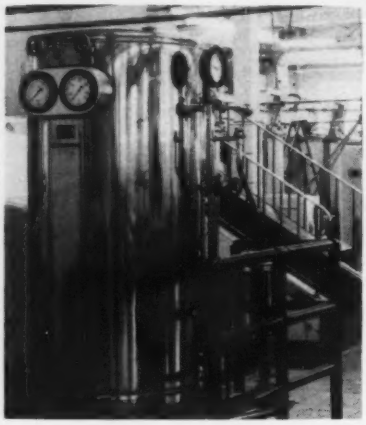
For more information on the "Green Pack" or any of the conveyor belts developed by B.F.Goodrich for safer, more efficient food-handling, call your BFG distributor or write *B.F.Goodrich Industrial Products Co., Dept. M-187, Akron 18, Ohio.*

B.F.Goodrich

CONVEYOR BELTS

by a metal belt in the programmer. Programmer and trend recorders are housed in pull-out chassis and mounted in a console or existing panel remote from analyzer. Available at the programmer are switches for injecting standard samples and running chromatographs, also individual component attenuators.—*The Foxboro Co., Foxboro, Mass.*

Circle 410 On Inquiry Card



Margarine Pasteurizer

This latest Dutch unit offers efficient pasteurization of margarine emulsion.

Product is heated to 185F., then cooled to 85F. The process destroys enzyme producing microorganisms, coli bacteria, and fungi. Moreover, stability of the final product reportedly is improved by pre-crystallization of the emulsion in the cooling section.

Unit is fully instrumented and designed for in-place cleaning. There are no moving parts and all product-contact surfaces are of stainless steel. Pasteurizer uses 30-psi. saturated steam; the cooling section 50-75F. water.

Capacities of various models range 1,000-10,000 lb. per hr. The largest unit requires about 4x4x8 ft. of space.—*Gebr. Stork & Co., Amsterdam, Holland.*

Circle 411 On Inquiry Card

Process-Control Meter

At the press of a button, this meter delivers a pre-set quantity of liquid. Then, its mechanism is automatically re-set to duplicate the delivery.

One meter (Electrivolume) can be used to actuate other units to deliver automatically in any desired sequence. Pressing the button at the master meter puts the entire series into operation.

Unit can start or stop pumps, and operate solenoid valves, signaling devices, electric relays, or other processing equipment. Thus, it can be the master control center for a complete cycle of operations.—*Buffalo Meter Co., Buffalo, N. Y.*

Circle 412 On Inquiry Card

Nitrogen Gas Generator

Nitrogen gas for process blanketing and inert-gas packaging is continuously produced in a new fuel-gas burning unit.

Known as Nitralene, unit delivers gas at 135 psig. essentially free of all impurities, except oxygen. Latter, however, can be limited to 90 ppm. or less. Unit eliminates handling and storage cylinders, also can be located at any convenient point and tied into an existing distribution system.—*General Electric Co., Schenectady, N. Y.*

Circle 413 On Inquiry Card

(Continued on page 112)

KLENZADE

IN • PLACE

Spray Cleaning

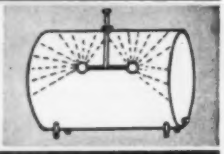
FOR THE FOOD PROCESSING INDUSTRIES

New Cleaning Techniques Save Time – Cut Costs

Processing Vats—in-place spray cleaning or portable units for batteries of similar vats.

KLENZADE MODERN

Storage Tanks — complete systems for pipeline cleaning and in-place spray cleaning.



CLEANING AIDS

Over-the-Road Tanks — in-place spray cleaning for haulers of lard, edible oils, liquid eggs, liquid sugar, etc.

Recirculation Cleaning

Complete semi or fully automatic systems for cleaning and sanitizing pasteurizers, evaporators, vacuum pans, pressure cookers, high temperature equipment.

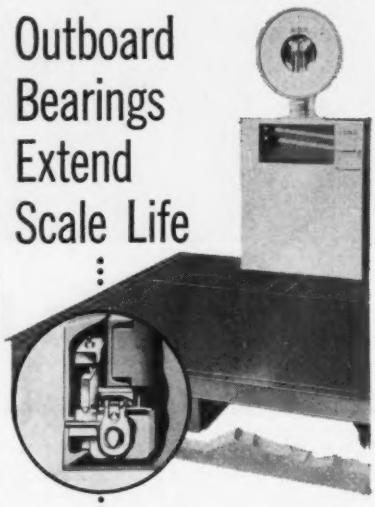
Write for Descriptive Literature

KLENZADE PRODUCTS, INC.

Systematized Sanitation All Over the Nation

Dept. 30L, BELOIT, WISCONSIN

Outboard Bearings Extend Scale Life



Only DETECTO gives you OUTBOARD BEARINGS!

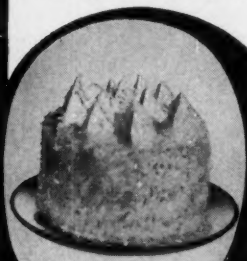
Write for information on full line of industrial weighing equipment from 1/100 oz. to 100 ton:

Detecto Scales, Inc., Dept. FE-3
540 Park Ave., Brooklyn 5, N.Y.

CIRCLE 110 ON INQUIRY CARD

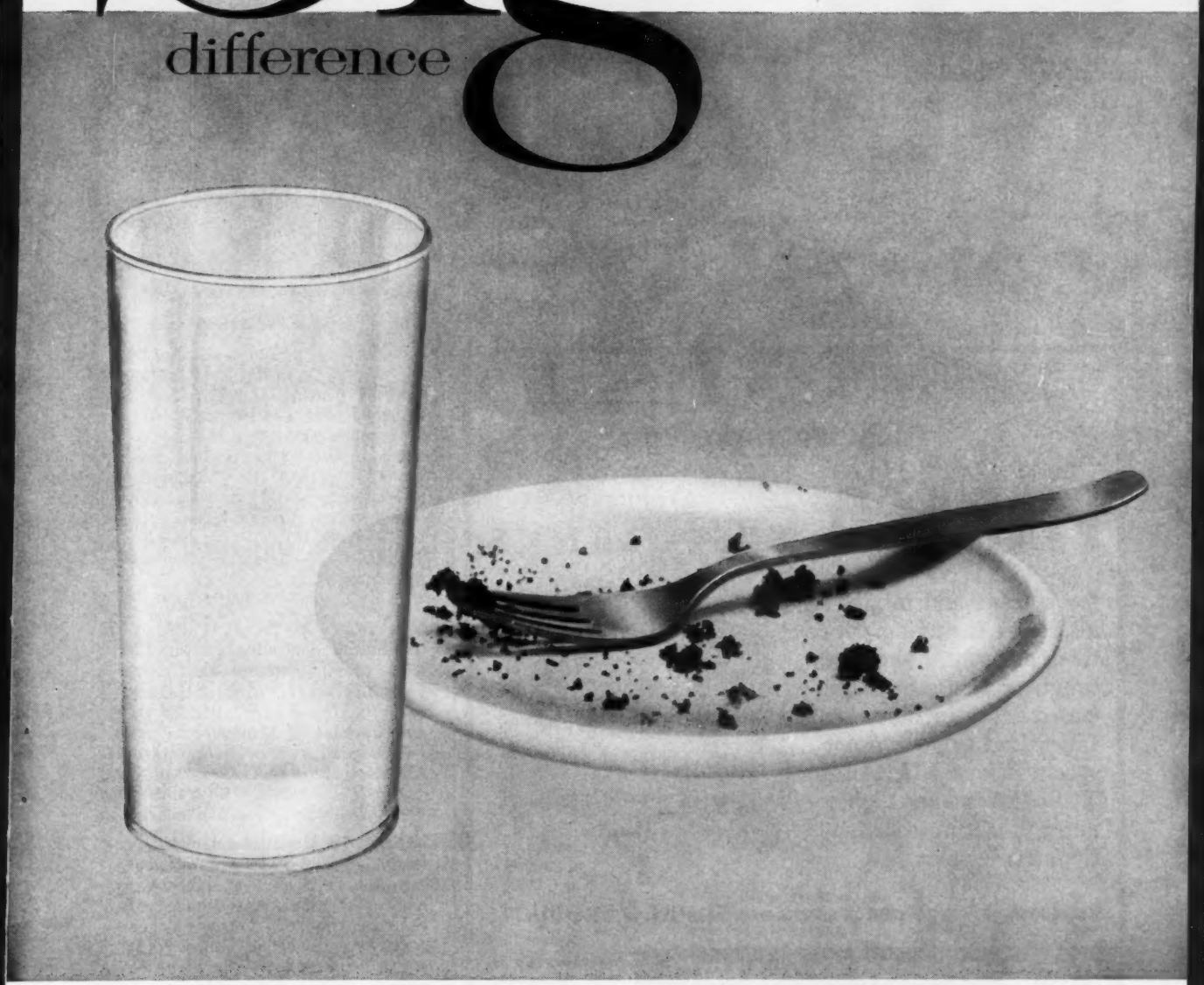
CIRCLE 135 ON INQUIRY CARD

a little cmc makes a big difference



It looked tasty in the bakery—it lived up to its looks at home. That's why it disappeared fast. And a little Hercules Cellulose Gum, purified CMC, made the big difference. But even if the cake had lasted longer, the icing—and the cake itself—would have remained fresh and tasty, because they both contain a little cellulose gum. It makes a big difference in icings. It prevents "weeping" and also retards crystal growth, keeping the icing surface smooth and velvety. For real "frosting on the cake," see the difference a little cellulose gum can make.

For complete details write to Hercules.



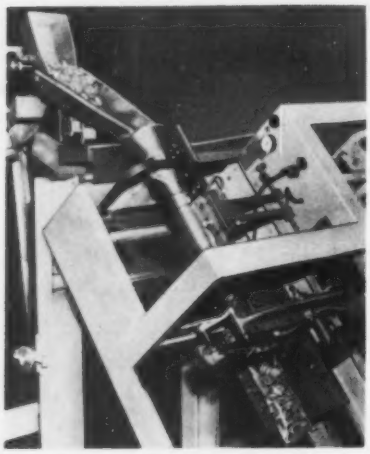
Hercules® Cellulose Gum

VC61-3

HERCULES POWDER COMPANY
INCORPORATED

Hercules Tower, 910 Market Street, Wilmington 99, Delaware

CIRCLE 111 ON INQUIRY CARD



Packages Cookies, Etc.—Without the Crumbs

This unit automatically removes crumbs or dust while packaging candy, cookies, or crackers in a flexible bag. It is also designed to prevent fragmentation by providing a sliding movement through the bag-forming tube, rather than a sharp drop.

As product empties from a conveyor, it passes over a vibrating screen that removes loose particles. It then completes its gliding movement into the bag that is formed around it. Unit (Verti-Pak) operates at speeds up to 50 packages per min. for each forming tube.—*Mercury Heat Sealing Equipment Co., Philadelphia.*

Circle 414 On Inquiry Card

Ultrasonic sensing and switching system provides liquid and solid level control, counting, and sorting. System (Sonac), consisting of sensors and an amplifier, detects ferrous or non-ferrous metals, and opaque or transparent objects. — Delavan Mfg. Co., W. Des Moines, Iowa.

Circle 415 On Inquiry Card

Tumbling Mixer for dry solids offers increased speed and efficiency. Unit (Strata-Screen Mixer) has screens mounted radially on a fixed cone to provide an infinite number of flow patterns.—Hobam, Inc., Buffalo, N. Y.

Circle 416 On Inquiry Card

Electronically Controlled bulk filler for cottage cheese dispenses 2-60 lb. per cycle. Pump drive for unit (Model 527) is variable (22-220 rpm.), and all product-contact surfaces are of sanitary construction.—Anderson Bros. Mfg. Co., Rockford, Ill.

Circle 417 On Inquiry Card

For the Lab

Stirs While Heating

With use of a Teflon stirring bar, this versatile unit permits simultaneous heating and stirring. Or it may be used either as a stirrer or hotplate alone.

The 400-w. unit reaches maximum temperature in less than 5 min. Thermostatic control prevents overshoot on warmup, holds surface temperature to 700F. Top plate is 3¼x3¼ in.—*Scientific Products, Evanston, Ill.*

Circle 418 On Inquiry Card

Graduated Cylinder is supplied with plastic bumper that curbs breakage when cylinder is accidentally tipped over. Plastic ring also doubles as a marker to gage volume to pour or be poured.—Kimble Glass Co., Toledo, Ohio.

Circle 419 On Inquiry Card

Improved MacMichael Viscosimeter, with bath temperature ranging 300 F., enables easy gaging of viscosities over a million centipoises. Construction features: Precise temperature control, reproducible bath and cup speeds, standardized plungers, accurate leveling, and an easily read scale.—Fisher Scientific Co., Pittsburgh, Pa.

Circle 420 On Inquiry Card

Supplying Food Processors is Our Business

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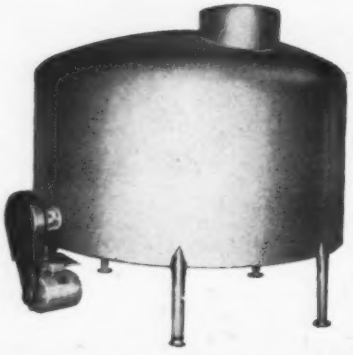
for storage and mixing; all styles including vertical, horizontal and rectangular . . . open or closed . . . in stock or fabricated to your exact specifications. FILPACO TANKS mean higher quality, lasting satisfaction, more value.



Hundreds of food processors use FILPACO PRODUCTS!

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THE FILTER PAPER CO.
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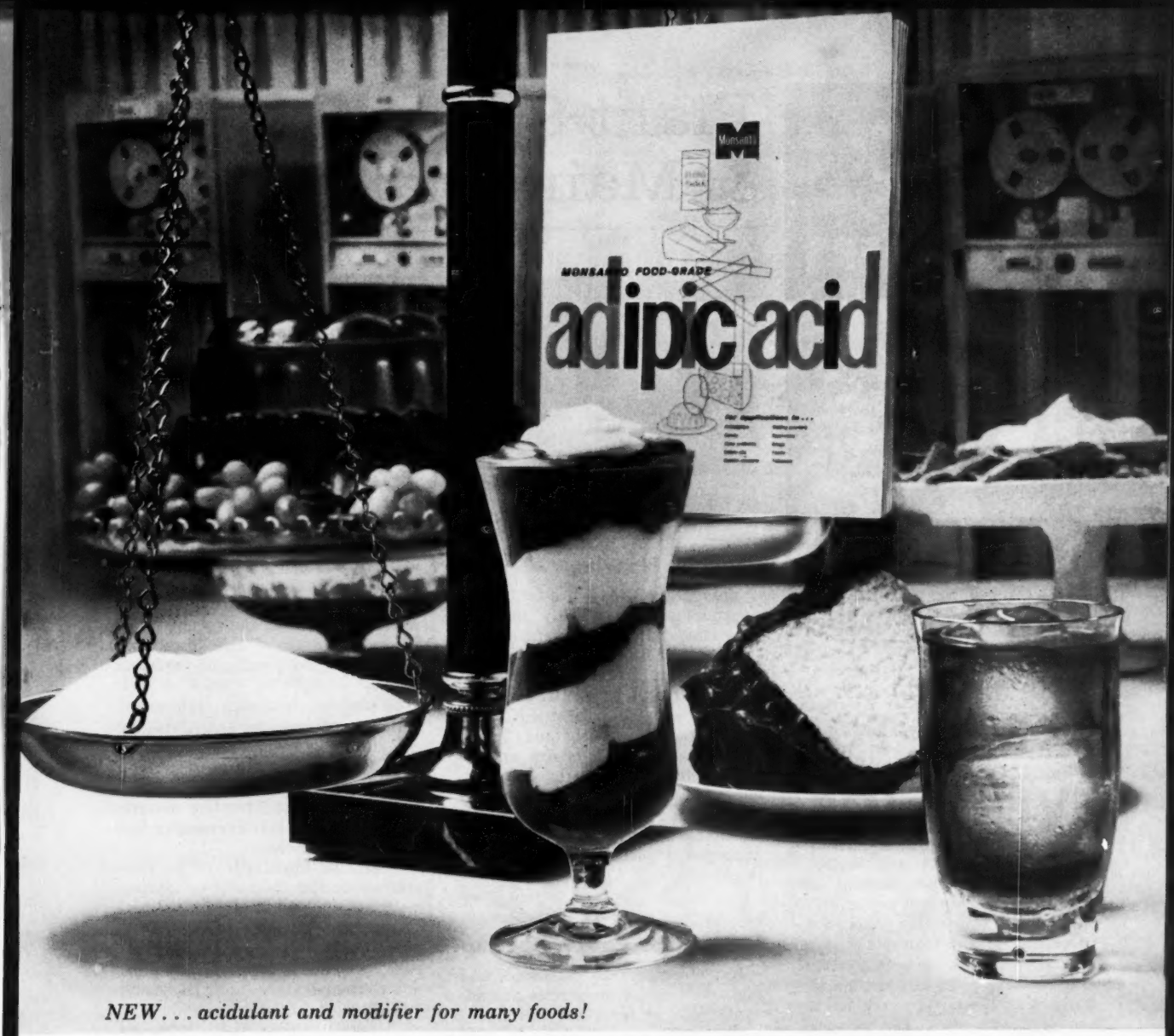
We invite your inquiry! We manufacture an extensive line of filters, filter materials, tanks, mixers and fillers.



NEW... acidulant and modifier for many foods!

How *Food-Grade* Adipic Acid* can tantalize the palate (and tickle the treasurer)

Monsanto *Food-Grade* Adipic Acid — *FDA-approved!* — promises you money-saving advantages unmatched by any other food acidulant. It performs better than citric or tartaric in a *host* of applications.

Check this partial "can-do" list: Add lemony tartness to desserts, beverages, candies. Make smoother spreads, creamier dips. "Uncurdle" puddings. Pinpoint pH control as never before.

And, check this! Lets you relax!—*Nonhygroscopic* Monsanto *Food-Grade* Adipic Acid safeguards the shelf life of your mixes and powdered concentrates.

Uses galore! Benign buffering agent. Tenacious foam stabilizer. Flavor exciter. Fantastic "texturizer." (And cost-cutting possibilities go along with every one of these uses!)

Skeptical? Well, sir, just get the facts and run a sample through your test kitchen. Then step ahead of your competition with a better product!

**Pure white Monsanto* Food-Grade *Adipic Acid, granulated to unvarying mesh characteristics, is so stable it doesn't decompose even in the molten state. And, of course, you can store it* indefinitely.

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Organic Chemicals Division
Fine Chemicals Dept. 4455AA
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Monsanto

Please rush ☐ my copy of the technical booklet "Monsanto Food-Grade Adipic Acid" and ☐ send me a sample for testing.

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first in silicones **Dow Corning**

Plant Sanitation & Maintenance

Pre-Fab Flooring

This ready-to-lay pre-fabricated flooring may be quickly installed over almost any floor surface.

Called "Nu-Flor," it is recommended for resurfacing concrete, wood, or metal floors. The 2x3 ft. sections provide a resilient, nonslip surface that withstands heavy traffic loads. Sections are applied in a 2-step operation by inexperienced personnel, reportedly without interrupting traffic or production.

Standard sections are supplied in packages of 8 sheets, each ¼ in. thick.—*Monroe Co., Cleveland.*

Circle 421 On Inquiry Card

Solventless Epoxy Coating

Extreme chemical resistance and high mechanical properties are advantages cited for a new solventless epoxy coating—a two-pack cold cured system.

Principal use of the coating is protection of plant surfaces, tanks, and pipelines. Steel surfaces to which coating is applied should be grit blasted, clean and dry; concrete should be clean, dry, and free of surface dust.

Because there is no carrier solvent, films up to 0.020 in. thick can be achieved with one application. Moreover, forced-air circulation is not required when coating is applied in an enclosed space. However, some type of protective apparatus should be used under these conditions.

Coating resists corrosion by acetic and lactic acids in concentrations up to 10%, and is also virtually unaffected by long contact with solvents and oils. With proper surface preparation, its adhesion to steel and concrete is excellent.

Material has a pale cream color, is applied by brush or spray, and dries in 4-8 hr. Full cure time is 7 days. Spreading rates range 35-40 yd. per gal. at 0.005 in. thickness to 8-10 yd. per gal. at 0.020 in. thickness.—*Lewis Berger Ltd., Dagenheim, Essex, England.*

Circle 422 On Inquiry Card

3-A Standards Announced

New 3-A Sanitary Standards—for fillers and sealers of single-service containers, for batch and continuous ice-cream freezers, and for rubber and rubber-like materials—were completed at the recent semi-annual meeting of the Standards Committee. Publication is expected shortly.

In general, food-plant equipment which conforms to 3-A Sanitary Standards is acceptable to public-health officials in most areas. Top priority was given to the standard for rubber and rubber-like materials because of their increasing use in food equipment.

Tentative standards to be considered at the Committees' spring meeting include those for: Ice-cream and cottage-cheese fillers, batch pasteurizers, air under pressure, automatic vendors, fittings, pumps, separators and clarifiers, and plastics.

Circle 423 On Inquiry Card

Insect Spray with 100% active ingredients is termed particularly effective against all flying and crawling insects. Concentrated product is non-toxic to humans and can be applied by fog generators, electric sprayers, or hand sprayers.—National Chemsearch Corp., Dallas, Tex.

Circle 424 On Inquiry Card

Fluorosilicone Greases offer serviceability over wire temperature spans; good lubricity, solvent and chemical resistance; and a high degree of inertness. A particular application is lubrication of conveyor bearings subject to corrosion, and which travel through either low- or high-temperature zones. — Dow Chemical Co., Midland, Mich.

Circle 425 On Inquiry Card

Food Ingredients & Additives

Liquid Smoke Flavor

Reproducible smoke flavor may be conveniently imparted to foods with use of a natural smoke solution.

Called Char Sol, product is made by controlled, limited burning of hard wood and subsequent absorption of the smoke in water. This procedure reportedly absorbs the smoke's desirable flavor constituents in a balanced proportion. Thus, there is no objectionable preponderance of any one type of flavor, such as phenolic or creosotic. Moreover, a special absorption-filtration process removes insoluble tars.

Product is approved as a food ingredient by FDA. According to MID, it may be used in meat and meat-food products subjects to individual application and approval. Typical applications include sausage items, bacon, and hams.—*B. Heller & Co., Chicago.*

Circle 431 On Inquiry Card

Fermentation Nutrients

Three new fermentation nutrients, corn products specially prepared for uniformity, are available as powders containing over 90% starch.

Called "Amber," group includes a free-flowing product (No. 600) an acid-modified material with low water viscosity (No. 826), and a precooked product (No. 816). They are packed in 100-lb. paper sacks.—*Amber Laboratories, Inc., Milwakee.*

Circle 432 On Inquiry Card

Papain Enzyme Product

A wider pH range at moderately elevated temperatures and consistent uniformity are advantages cited for a new papain enzyme product.

The protein digestant tenderizes meats, improves the yield and purity of fish-liver oils, and liberates fats and oils from chocolate liquors without the necessity of hydraulic pressing or solvent extraction. Papain is also used as a chewing-gum ingredient.

For tenderizing meats, the enzyme may be used as a powder or in solution. In mass production, meats are dipped in a papain solution, removed, and drained. After a brief holding period, meats are frozen to stop enzymatic action until they are thawed slightly and cooked.—*Miles Chemical Co., Elkhart, Ind.*

Circle 433 On Inquiry Card

Natural Fermentation Flavor for yeast-leavened baked goods has FDA approval for use at levels up to 2% by weight of flour. Product (Vico 400) is available in two types, with or without dough-softening effect.—Vico Products Co., Chicago.

Circle 434 On Inquiry Card

Monosodium Glutamate will be produced in commercial quantities by a new microbiological process. Based on a bacterial organism recently discovered in Japan, the technique offers a free-flowing product of high purity.—Commercial Solvents Corp., N.Y.C.

Circle 435 On Inquiry Card

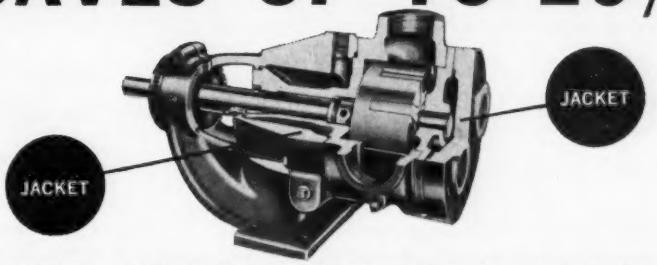
High-Potency Mixture of diastatic enzymes converts starch to soluble sugars and dextrins. Major applications of product (Hydralase D) are in processing of high-conversion corn syrup, pre-cooked baby foods and breakfast cereals, chocolate syrups, scrap candy (to recover sugar), and alcoholic beverages.—Nopco Chemical Co., Newark, N. J.

Circle 436 On Inquiry Card

Modified Starch for frozen foods offers excellent freeze-thaw stability plus high gel and thickening power when cooked to 185F. Bland product (Freezist) is compatible with all food acids, produces clear gels. — Morningstar-Paisley, Inc., N.Y.C.

Circle 437 On Inquiry Card

NEW DESIGN SAVES UP TO 20%



VIKING'S COMPLETE NEW LINE OF JACKETED STAINLESS STEEL* PUMPS

*Also other alloys—nickel, Monel, steel, Ni-Resist, etc.

Now you save money on *new* type stainless steel* Viking Pumps and still get that same rugged, heavy-duty service. The new, improved design makes it possible. All parts coming in contact with the material handled are stainless steel or other specified alloy—other parts are cast iron. Its unique design incorporates a jacket chamber around the back of the pump, around the mechanical seal or packing chambers and over the head of the pump. This chamber permits cooling or heating of the liquid being pumped.

Mounting dimensions remain the same as Viking's previous compact line of alloy heavy-duty pumps, and without increased size for jacketing.

Six sizes from 10 to 110 G.P.M. are available. Pumps operate at full speed handling light liquids—at reduced speed for heavy viscous liquids. Pumps suitable for pressures up to 50 P.S.I. handling non-lubricant liquids—100 P.S.I. on lubricating liquids. Completely self priming with positive discharge.

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Free catalogs and bulletins on equipment, supplies, and services

PLANT ENGINEERING

HIGH VACUUM BOOSTER PUMPS. Describes rotary positive, two-impeller, dry type compressors designed for use in high vacuum systems for environmental applications and vacuum processing. 4p.—Roots-Connersville Blower, Connersville, Ind. **(211)**

SPEED CHANGER. Design features are provided for unit that boasts stepless speed changes within standard speed ranges of 2 to 1 through 10 to 1 at operating speeds from 1.8 to 4660 rpm. 4p.—Allis Chalmers, Milwaukee. **(212)**

SMALL ENGINES/GENERATORS. Introduces new family of units offering extensive interchangeability of parts, compactness, low maintenance, and ease of servicing. Onan Div. of Studebaker-Packard Corp., Minneapolis. **(213)**

LUBRICATING OIL. Ten viscosity grades of low cost oil, recommended for extremely wet conditions, are described with physical properties and application guides. 2p.—Sun Oil Co., Philadelphia. **(214)**

ADJUSTABLE SPEED DRIVE. Information on how to analyze, compare, and select units for various applications, plus product description and illustrations are provided for units ranging from 1/20 to 1000 hp. 32p.—General Electric Co., Erie, Pa. **(215)**

STAINLESS BALL VALVE. Designed for corrosive fluids, gases, and general corrosive services, new unit is described and detailed with cutaway views and pressure ratings. 2p.—Lunkenheimer, Cincinnati. **(216)**

SANITARY FITTINGS/VALVES. Describes more than 50 units, including engineering drawings and specs, for more efficient liquid line circuits, 12p.—Cherry-Burrell Corp., Cedar Rapids, Ia. **(217)**

CONTROL VALVES. Complete unit line in sizes from ¼" to 6" and available in metals including Ductile iron, cast iron, cast steel, stainless, bronze, monel, and aluminum, are detailed with features and capacity charts. 8p.—OPW-Jordan, Cincinnati. **(218)**

CONVEYING ELBOWS. Space-saving, rugged units available in 90-deg. bends and constructed of cast aluminum with Neoprene seals and a coupling at both ends, are illustrated and described. 2p.—Systems Engineering & Mfg. Co., Houston, Tex. **(219)**

PACKAGING

TRANSPARENT PLASTIC COVERS. Illustrates types available for use with aluminum foil containers in various shapes and sizes offering maximum product protection, complete visibility, and reclosure convenience. 6p.—Ekco-Alcoa Containers Inc., Wheeling, Ill. **(239)**

SKIN PACKAGING. Brief case histories show economy, adaptability, and protection afforded this low-cost packaging method which also offers easy inventory control and product identification. 8p.—Union Carbide Development Co., NYC. **(240)**

GLUE GUN SYSTEMS. Over 700 standard glue gun combinations, meeting every normal industrial requirement for adhesive application, are covered, including manual and machine-mount types. 6p.—John P. Fox Co., Monrovia, Calif. **(241)**

LABEL & TAPE PRESS. Details unit that prints, die-cuts, removes waste and rewinds pressure-sensitive labels or tape in one operation at speeds up to 150,000 labels/hr. 1p.—Columbia Label Corp., Chicago. **(242)**

ADHESIVE PROBLEMS. Illustrates and describes solutions to many difficult adhesive problems and lists many new adhesives, coatings and chemical compounds for industrial applications. 12p.—Adhesive Products Corp., NYC. **(243)**

BOXBANDER. Introduces a simple method of package sealing without expensive equipment or costly overwraps, offering facilitation of inventory control, visual recognition of full containers, and multiple banding for special promotions. 2p.—Halm Instrument Co., Glen Head, NY. **(244)**

FILLERS. Operating economies and mechanical features of a complete line of rotary piston models for liquid or viscous food are described and illustrated.—Girdler Process Equipment Co., Chicago. **(245)**

RIGID FOIL ALUMINUM PANS. Contains specs and illustrations of wide range of containers suited for bakery operations, including data on lid-closing equipment. 4p.—Kaiser Aluminum & Chemical Corp., Oakland, Calif. **(246)**

CORD STRAPPING. Evaluates strapping materials to verify and discuss strength and performance of rayon types. 12p.—American Viscose Corp., Philadelphia. **(247)**

GLUE SPRAY KIT. Describes cost- and maintenance-saving kit to replace roll-type adhesive applicators for corrugated case sealing. 2p.—Huntingdon Industries Inc., Bethayres, Pa. **(248)**

MATERIALS HANDLING

PNEUMATIC CONVEYOR SELECTION. Shows how to determine correct system for any pulverized or granular material, including list of material and flow characteristics that must be considered. 4p.—Fuller Co., Catasauqua, Pa. **(266)**

SITDRIVE FORK TRUCK. Details new heavy duty space saving unit with unique drive control system that permits exact inching and load spotting. 6p.—Lewis-Shepard Products Inc., Watertown, Mass. **(267)**

STEEL BELT CONVEYORS. Provides 36 line-drawings and seven photos illustrating applications and features of new types for all around use. 8p.—Sandvik Steel Inc., Fairlawn, N. J. **(268)**

ROTARY BULK FEEDERS. Provides specs and illustrations of units for feeding bulk materials, especially foods or fruits, under high differential pressures, with special protective devices and easy maintenance. 6p.—Beaumont Birch Co., Philadelphia. **(269)**

BUCKET ELEVATORS. Gives features, applications, charmined delivery rate for bulk materials. 4p.—Springacteristics of two models offering uniform, pre-deterfield Welding Co., Inc., Springfield, N. J. **(270)**

Food Eng 6on7x20 8-11 WEISS (14)

SANITATION & MAINTENANCE

STEAM CLEANING EQUIPMENT. Gives specs and illustrations of units for bottle washing; utensil cleaning; floor & wall cleaning; sanitizers; acid cleaners; bake pan cleaning; and in-place pipe line cleaning. 4p.—Kelite Corp., Berkeley Heights, N. J. **(251)**

IODINE DISINFECTANTS. Two new types, for effective use against a broad spectrum of bacteria, are detailed with application data.—National Chemsearch Corp., Dallas, Tex. **(252)**

INDUSTRIAL GLOVES. Revolutionary disposable vinyl type features unequalled touch sensitivity and transmissivity for intricate industrial work where protection of product as well as hands is necessary.—Wilson Rubber Co., Canton, O. **(253)**

DISPERSIVES. Custom engineered types formulated to minimize adherent sludge formation in boilers and recirculating cooling systems are discussed.—Hagan Chemicals & Controls, Pittsburgh. **(254)**

SEWAGE TREATMENT CHEMICALS. Describes a variety of products for food packers and brewers with large

(Continued on page 118)

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. . . simply circle key item number (found at the end of each item) on handy Inquiry Card—back of book. Then print your name and address, and mail.

Rheem Centrifugal Lining process makes pail linings completely dependable, for best product protection

Look at the blisters and pinholes in the unretouched pail lining photo at top. On impact, the blisters may break, introducing foreign particles into the product. Or, pinholes will expose the contents to bare steel. Chalk up one pail of ruined product – and one unhappy customer.

Now, look at the section of pail lined by the exclusive Rheem Centrifugal Lining process. No blisters. No pinholes or skips. No globs or thin spots, either.

Rheem lined pails assure the same product purity on delivery as at filling. Here's why:

The patented Rheem Centrifugal Lining process, first method that's not merely an adaptation of painting techniques, operates by centrifugal force instead of air pressure.

Air turbulence is eliminated, allowing a uniform coating to be applied, even in the bead. Solvent content is reduced, minimizing pinholes. The grease and grit of hose lines are avoided. Since the process is completely automatic, human error is eliminated, assuring a lining free of skips, globs and thin spots. The result is the best protection you can get for products packed in pails.

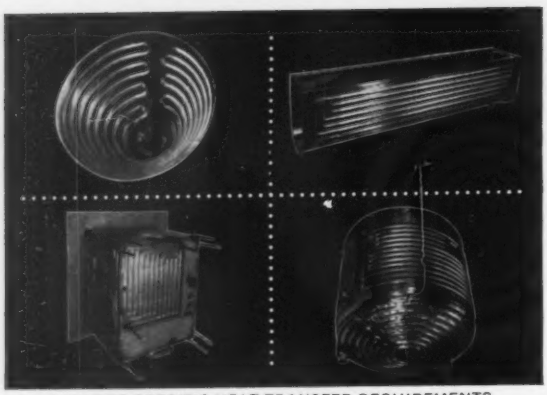
If you are now using pails lined by another process, or using packages of other basic materials, write for samples, information on linings, or a special testing program. Rheem Manufacturing Company, 1701 West Edgar Road, Linden, N. J. Plants across the country.

WORLD'S LARGEST MANUFACTURER OF STEEL SHIPPING CONTAINERS

Rheem

How it works: Pail shells move up to automatic Centrifugal Lining equipment (left). Positioning arms clamp pail and (right) raise it past spinning centrifugal applicator head. Angle, distance and speed never vary. Result: completely uniform linings – completely dependable protection for your product.

CIRCLE 117 ON INQUIRY CARD



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PLATECOIL® solves process heating and cooling problems

Tranter PLATECOIL eliminates engineering and fabricating pipe coils for a wide variety of heat transfer requirements. Tranter will deliver to you, the complete package required for any specific need—including the vessel itself. PLATECOIL provides high heat transfer efficiency and low operating and maintenance costs.

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PLATECOIL® DIVISION

heat transfer specialists

TRANTER MANUFACTURING, Inc., LANSING 9, MICHIGAN

CIRCLE 136 ON INQUIRY CARD

complete information on Spraying Systems Co. spray nozzles for spray drying

In this new bulletin you will find complete information and performance data on all Spraying Systems nozzles for spray drying. Here are the nozzles that have proved themselves for overall high efficiency in all the applications of spray drying. Whatever the spray dried product may be, Spraying Systems offers a nozzle type and capacity for your installation.

WRITE FOR YOUR FREE COPY of Bulletin 108

SPRAYING SYSTEMS CO.

3212 Randolph Street • Bellwood, Illinois

Just Off The Press (continued)

food wastes, including new odor controller, defoamer, and insecticide. 6p.—Brulin & Co., Indianapolis, Ind. **(255)**

HEAVY-DUTY/DECORATIVE FLOORING. New light weight, high impact flooring material is illustrated and described, including data on its exceptional adhesion, chemical and water resistance, abrasion resistance, and ease of installation.—Coloron, Lansing, Mich. **(256)**

FURNACE FUME CONTROL. How to control electric furnace fumes is explained with detailed photos and sketches of new exhaust hood with synthetic-fabric dust collector. 6p.—Pangborn Corp., Hagerstown, Md. **(257)**

HYDROCARBON DISTILLATES. Applications discussed include insecticides for food processing and storage areas, defoaming agents, insecticide removers, and froth floatation mixtures. 3p.—Sonneborn Chemical & Refining Corp., NYC. **(258)**

CLEAN ROOM CONSTRUCTION. Details a single source for custom-designing and constructing facilities within existing plant. 7p.—Unistrut Products Co., Chicago. **(259)**

INGREDIENTS

NATURAL SMOKE SOLUTION. Details a new FDA-approved solution that imparts complete, controlled penetration of smoke flavor to meat products without usual smoking operation. 4p.—B. Heller & Co., Chicago. **(261)**

ENRICHMENT. Answers question "What is enrichment" and gives facts on its value in bread baking. 4p.—Hoffmann-LaRoche Inc., Nutley, N. J. **(262)**

MARKETING

CENSUS INFORMATION. Types of census data and ways in which marketers can use it are discussed, including '60 figures on population, housing, business, manufacturing, agriculture, governments, and foreign trade. —Small Business Administrations, Washington, D. C. **(291)**

DIETS AND DIETARY AIDS. Study provides data on use of dietary aids and extent of dieting among wage earner wives, dietary aids used and frequency of use. 15p.—Macfadden Publications, Inc., NYC. **(292)**

MARKETING COST ANALYSIS. Shows how to reduce selling costs through development of a "functional" code of accounts, determination of the unit of work involved in each functional marketing area, and analysis of costs in comparison with other firms. 4p.—Stewart, Dougall & Assoc., NYC. **(293)**

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NEW EUROPEAN MARKET. Provides an economic profile of Europe, including recent market changes, its impact on U. S. exporters, and descriptions of the European Common Market and European Free Trade Assn. 52p.—Chase Manhattan Bank, NYC. **(301)**

GOING INTO BUSINESS. Checklist provides details on chances for success, including psychological questions on your business personality as well as basic questions of capital, location, prices, etc. 4p.—Small Business Administration, Washington, D.C. **(302)**

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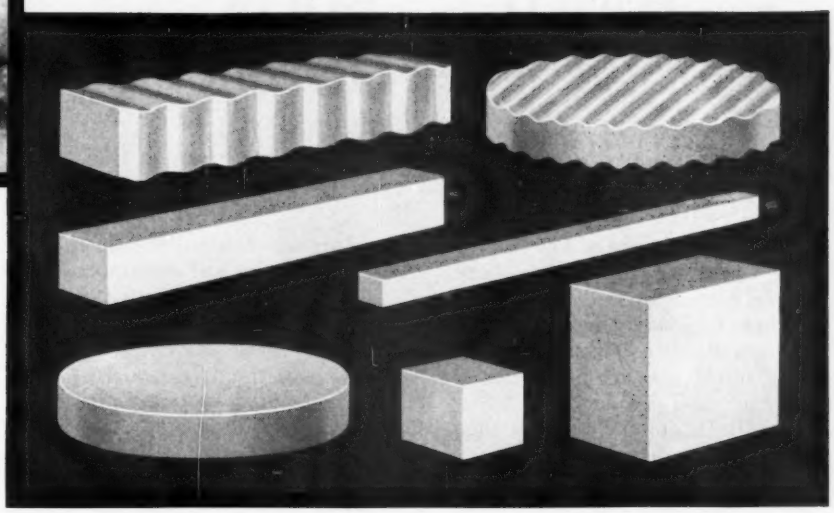
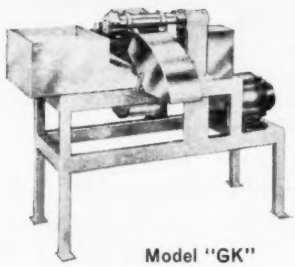
Other Food Products—The Model "GK" was designed expressly to make tempting corrugated cuts on potatoes. It will produce excellent potato straight cuts, too, but is not recommended for other food products. For straight cuts on other products to sizes listed, request full information on the Urschel Model "G".

The "GK" precision-cuts potatoes up to 11 tons an hour . . . *gently*.





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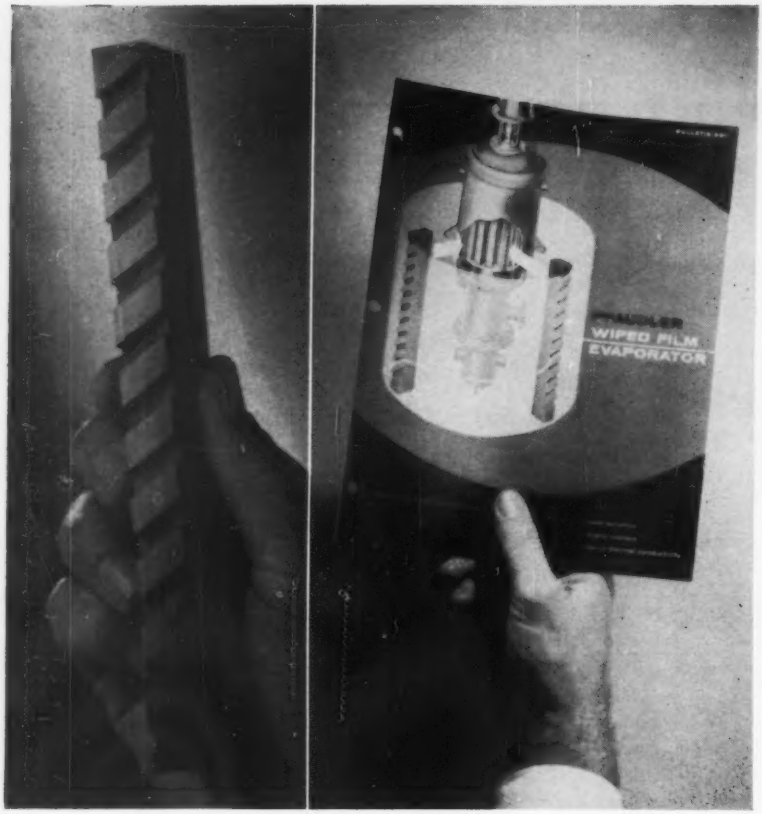

HAND BOOK for increased efficiency in food evaporation

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These wipers wet the entire evaporator wall with a thin, uniform film. As a result, you get high thermal efficiency and excellent heat transfer—both important factors when you're evaporating *heat-sensitive* or *highly viscous* foods like tomato, honey, syrup and fruit juices.

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Useful New Books

Food Processing Guide

A GUIDE TO THE SELECTION, COMBINATION AND COOKING OF FOODS *by Carl A. Rietz. The AVI Publishing Co., Westport, Conn. 1961. 395p.*

Here is a new type of book, for it is the first attempt ever made to determine what foods "go together" and to indicate a simple method of selecting combinations which are sure to please the average palate.

The Gustametric Charts contained in this volume, summarize a lifetime of study of the flavor ratings of all common, and many uncommon foods, and present the data in monograph form. With a little study, anyone, even a person who does not understand the rating system used, can use these charts to intelligently improve recipes and select pleasing combinations of flavors.

Coffee Statistics

COFFEE: BOTANT CULTIVATION AND UTILIZATION *by Frederick L. Wellman. Interscience Publishers Inc., 250 Fifth Ave., NYC 1. 1961. 488p. Price: $13.00.*

Dr. Wellman's book will make coffee a sounder investment, and help to insure its future. All aspects of the botany, cultivation, manufacture and utilization of coffee are fully covered.

Here is a much needed handbook for planters, scientists, agricultural advisory officers, administrators, and manufacturers.

Booklets & Reports

AGRICULTURAL STATISTICS, 1960. *Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C. 600p. Price: $1.75.* Annual handbook of farm facts includes data on agricultural production, prices, supplies, costs, income, and related subjects.

TRANSPORTATION OF AGRICULTURAL COMMODITIES IN THE U. S. *USDA, Washington, D. C. (Miscellaneous Publication No. 863).* Provides a bibliography of selected references from 1949-59.

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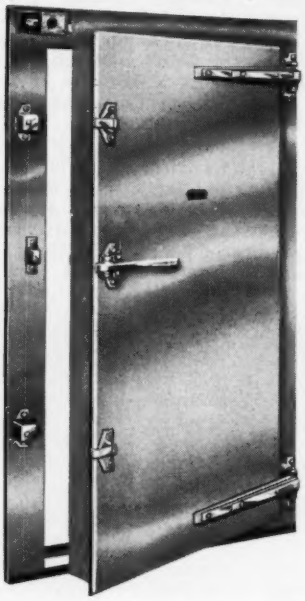

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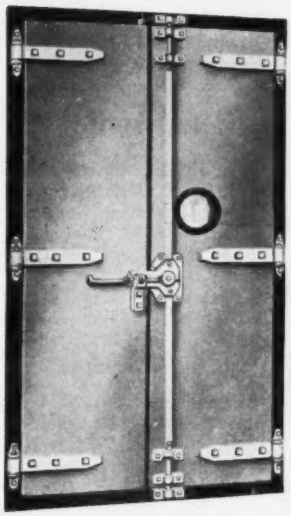

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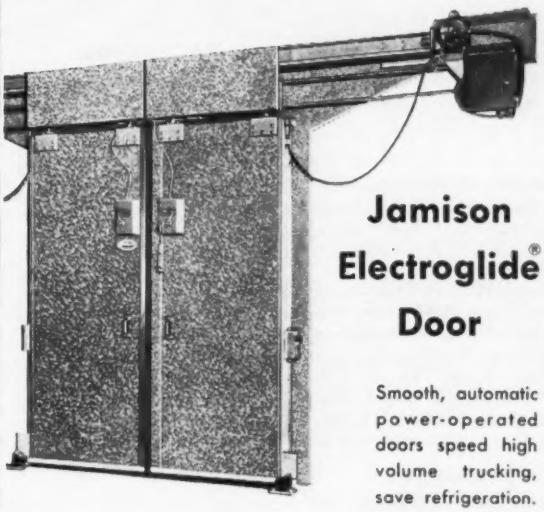

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Multi - Slotted Device With Inclined Surface and Comprising Many Combing Elements for Separating Hops From Foreign Matter.—F. E. Dauenhauer, Santa Rosa, Calif. No. 2,983,380.

Cooking Kettle With Restricted Inlet- and Outlet-Passages' Steam Supply Controlled To Prevent Superheating.—J. E. Thompson, Flossmoor, Ill. No. 2,983,488.

Machine for Shirring Tubular Cellulose Casings on Mandrel With Plurality of Cog - Surfaced Shirring Rolls. — E. A. Matecki, Union Carbide Corp., N.Y.C. No. 2,983,949.

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Egg Products Prepared From Liquid Eggs Inoculated With Non-Pathogenic, Salmonella - Resistant Strain of *E. Coli* and Then Fermenting and Drying Inoculated Eggs.—J. L. Stokes, USDA. No. 2,289,405.

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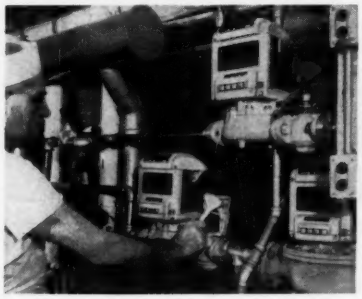

preset by pushbutton, taking less than 30 man-seconds to measure the sugar, syrup and water.

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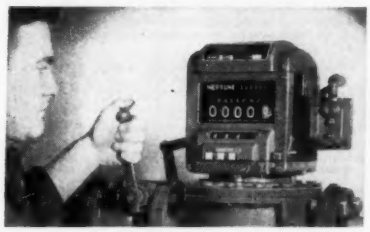

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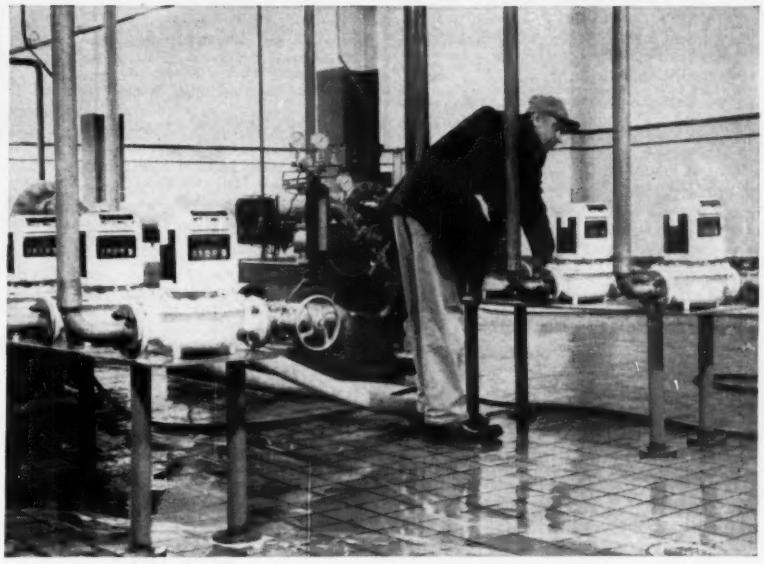

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WANTED

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WANTED: Quality Control Manager Trainee—Requisites: Substantial administrative and technical experience. Training in Bakery Science, Food Technology, Dairy Science, Bacteriology or Chemistry. Willingness to relocate. Nationally-known Frozen Food Company requires prime personnel for new plants opening during next five years. One trainee needed immediately. Applicants should cover above requisites and specify salary requirements. Address replies to Box FE-107, c/o FOOD ENGINEERING, Chestnut & 56th Streets, Phila. 39, Pa.

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BOX FE-105
c/o FOOD ENGINEERING, Chestnut at 56th, Phila. 39

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FRUIT PROCESSING PLANT

Canning Experience necessary, also, management ability. Write giving full personal data—expected starting salary—past working experience. Plant is located in Southwestern Michigan.

BOX FE-109
c/o FOOD ENGINEERING, Chestnut at 56th, Phila. 39

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FOOD DEVELOPMENT
MUST HAVE GROWTH POTENTIAL
ATTRACTIVE SALARY

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BOX FE-103
c/o FOOD ENGINEERING, Chestnut at 56th, Phila. 39

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BOX FE-108
c/o FOOD ENGINEERING, Chestnut at 56th, Phila. 39

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BOX FE-106
c/o FOOD ENGINEERING
Chestnut at 56th, Phila. 39

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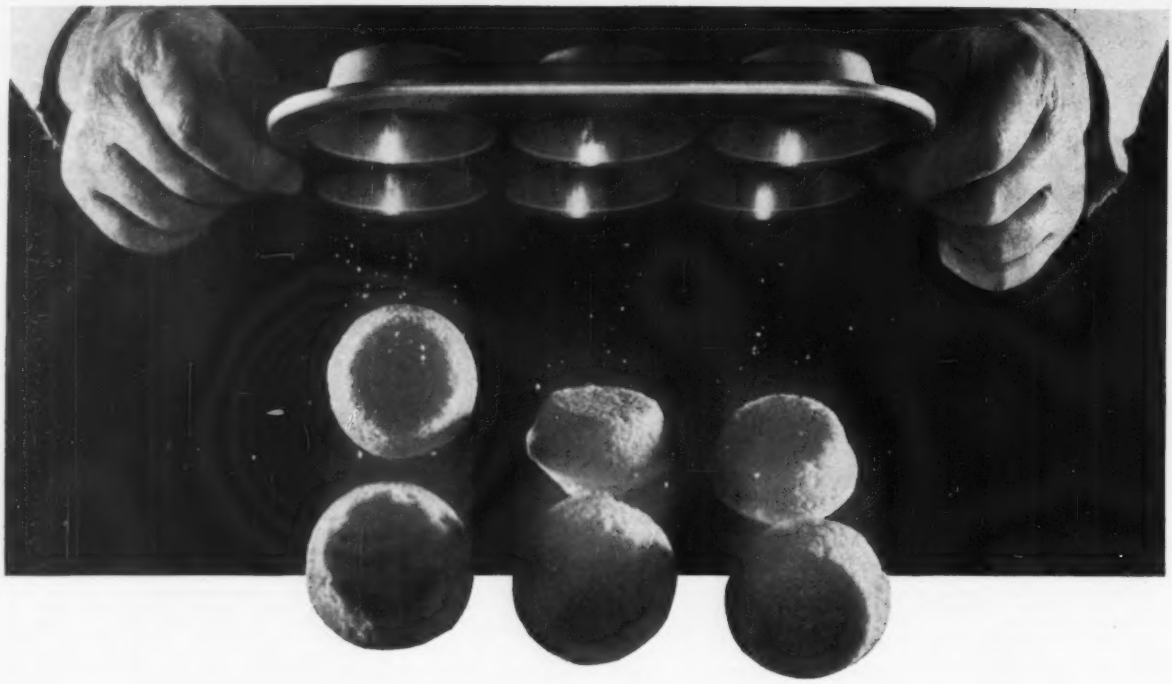

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55 **American Can.** Safety rim can.
95 **American Steel & Wire.** Cyclone conveyor belts.
61 **Angelus Sanitary Can.** Can closers.
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82 **Clinton Corn Processing.** Corn syrup, starch, oil, & lactic acid.
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4 **Dorr-Oliver.** Starch processing equipment.
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21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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Where ads offer more than one item, I've written key number and identity below

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NOVEMBER 1961
Expires Jan. 31, 1962

IMPORTANT MUST INFORMATION

Please check in A & B below best description

A—Your Function

☐ 1. Corp. or Admin. Mgmt.
☐ 2. Plant Operat. Mgmt.
☐ 3. Tech. or Eng. Mgmt.
☐ 4. Other

B—Principal Product

☐ 1. Baked Goods
☐ 2. Beverages
☐ 3. Confectionery
☐ 4. Fruits & Vegetables
☐ 5. Grain Products
☐ 6. Meat, Poultry, Fish
☐ 7. Milk & Milk Products
☐ 8. Sugar & Sugar Products
☐ 9. All Other Foods

FE 98

←**CHECK** *Important Must Information*

WRITE—*name, title, company and address*

CIRCLE—*number of items you want*

MAIL

Electrical Equipment

215 **Adjustable speed drive.** General Electric.

Forming Equipment

378 **Bun depanner.** Alto.
380 **Former & panner.** DCA Food Industries.
373 **Starch duster.** National Starch & Chemical.
345 **Twist linker, compact.** Barliant.
365 **Twister-panner.** J. H. Day.

Freezing Equipment

342 **Blast chilling unit.** Advanced Engineering.
346 **Portable CO_2 container.** Cardox.

Washing Machines

370 **Fruit washer model.** John Collins.

Heat Transfer Equipment

148 **Automatic cooling control.** Sarco.
136 **Heat transfer coils.** Tranter.

Ingredients & Additives

113 **Adipic acid.** Monsanto.
111 **CMC.** Hercules Powder.
82 **Corn syrup, starch, oil, and lactic acid.** Clinton Corn Processing.
114 **Defoamers.** Dow Corning.
262 **Enrichment.** Hoffmann-LaRoche.
30 **Enzymes.** Miles Chemical.
432 **Fermentation nutrients.** Amber Laboratories.
431 **Flavor, liquid smoke.** Heller.
434 **Flavor, natural fermentation.** Vico Products.
92 **Flavor proteins.** Nestle.
134 **Flavors.** International Flavors & Fragrances.
133 **Flavors.** Norda.
34 **Flavors, colors.** H. Kohnstamm.
19 **Food colors.** National Aniline.
436 **High-potency mixture.** Nopco Chemical.
2 **Ingredients.** Sterwin Chemicals.
435 **MSG.** Commercial Solvents.
66 **MSG.** Merck Chemical.
433 **Papain enzyme product.** Miles Chemical.
437 **Starch, modified.** Morningstar-Paisley.
62 **Stabilizers.** National Starch & Chemical.

Instruments, Measurement, & Control

375 **Checkweigher.** Toledo Scale.
53 **Checkweighers, automatic.** Exact Weight Scale.
340 **Checkweigher, package.** Exact Weight Scale.
410 **Chromatrographic analyzer.** Foxboro.
123 **Control Meters.** Neptune Meter.
406 **Control station, compact.** Taylor Instrument.
52 **Control Station, electronic.** Foxboro.
419 **Graduated cylinder.** Kimble Glass.
18 **Magnetic flow transmitter.** Taylor Instrument.
412 **Meter, process-control.** Buffalo Meter.
135 **Scales.** Detecto Scales.
362 **Temperature & humidity controller.** Partlow.
402 **Time-temperature indicator.** Minneapolis-Honeywell.
415 **Ultrasonic sensing & switching system.** Delavan Mfg.
420 **Viscosimeter, MacMichael.** Fisher Scientific.

Lubrication & Fuels

425 **Flurosilicone greases.** Dow Chemical.
214 **Lubricating oil.** Sun Oil.
371 **Multi-pan greaser.** Mallet.

Management Services

291 **Census information.** Small Business Administration.
302 **Business checklist.** Small Business Administration.
292 **Diets & dietary aids.** MacFadden.
305 **Entering British market.** Inter/Market Consultants.
301 **European market.** European Common Market.
303 **Management attitude for scientists.** Batelle Memorial Institute.
293 **Marketing cost analysis.** Stewart Dougall.
304 **Operating budgets.** Small Business Administration.
294 **Psychological pricing study.** Charles W. Hoyt.
423 **3-A Standards.** Standards Committee.

Materials Handling

361 **Batching system, automatic.** Pfening.
270 **Bucket elevators.** Welding.
269 **Bulk Feeders, rotary.** Beaumont Birch.
90 **Caster, sanitary.** Albion Industries.
219 **Conveying elbows.** Systems Engineering.
109 **Conveyor belts.** Goodrich.
95 **Conveyor belts, cyclone.** American Steel & Wire.
268 **Conveyor belts, steel.** Sandvik Steel.
377 **Conveyor belting.** Voss Belting.
23 **Conveyor screws.** Link-Belt.
266 **Conveyor selection, pneumatic.** Fuller.
230 **Dry ingredients feeder.** Creamery Package.
403 **Fork truck, multi-purpose.** Automatic Transportation.
267 **Fork truck, sitdrive.** Lewis-Shepard.
201 **Handling system, automatic.** Thermovac.
364 **Loading/unloading racks.** Nestaway.
76 **Pallet truck, automatic.** Automatic Transportation.
366 **Pan stacker.** Union Steel.
367 **Running rack.** Read Standard.
363 **Traveling gate grouper.** Read Standard.
231 **Screens, conveyors, vibratory.** Comco.
48 **Silicone release agent.** Dow Corning.

Mixing Equipment

359 **Continuous mixer.** Ambrette Machinery.
405 **High-speed mixer.** Excelsior Industrial.
358 **Mixer, whipper, & chiller.** Creamery Package.

NOVEMBER 1961
Expires Jan. 31, 1962

CHECK→ ***Important Must Information***

IMPORTANT MUST INFORMATION

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- ☐ 8. Sugar & Sugar Products
- ☐ 9. All Other Foods

MAIL

FE 98

Name ..... **Title** .....

Company .....

Address .....

City ..... **Zone** ..... **State** .....

Do you wish to receive FOOD Engineering? YES ☐ NO ☐

Please send me further information on the items circled below—

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108 **Mixers.** Mixing Equipment.
357 **Pushbutton mixer.** American Machine & Foundry.
416 **Tumbling mixer.** Hobam.
356 **Variable-speed mixer.** J. H. Day.

Moisture Removal Equipment

120 **Evaporators.** Pfaudler Permutit.
6 **Freeze-drying system.** FMC.

Packaging Equipment

337 **Bacon wrapper.** Bartelt Engineering.
353 **Bag loader/sealer.** Carbert Mfg.
354 **Bagger.** FMC.
352 **Bread wrapper.** Package Machinery.
244 **Boxbander.** Halm Instrument.
417 **Bulk filler.** Anderson Bros.
351 **Cake film wrapper.** Battle Creek Packaging Machines.
61 **Can closers.** Angelus Sanitary Can.
341 **Continuous stuffer.** Allbright-Nell.
414 **Crumb remover/packager.** Mercury Heat Sealing Equipment.
245 **Fillers.** Girdler Process Equipment.
241 **Glue gun systems.** John B. Fox.
248 **Glue spray unit.** Huntingdon.
379 **Infrared wrapper.** American Machine & Foundry.
242 **Label & tape press.** Columbia Label.
50 **Piston filler with monitor.** Girdler.
336 **Straightline wrapper.** Crompton & Knowles.
339 **Vacuum packaging unit.** International Kenfield.

Packaging Materials

243 **Adhesive problems.** Adhesive Products.
312 **Boxes, foil lined.** Stone Container.
55 **Can, safety rim.** American Can.
311 **Container for moist foods.** Dixie Cup.
313 **Dispenser closure.** Stull Engraving.
355 **Duo-pack unit.** Package Machinery.
316 **Film, shrink-tight.** Goodyear Tire & Rubber.
315 **Foil, patterned.** Ekco-Alcoa.
314 **Packages for butter.** Kimble Glass.
338 **Package for sliced bacon.** Riegel Paper.
27 **Packaging paper.** Riegel Paper.
239 **Plastic covers, transparent.** Ekco-Alcoa.
5 **Plastic packages.** J-E Plastics.
240 **Skin packaging.** Union Carbide.

Pipes, Valves, Tubing

218 **Control valves.** OPW-Jordan.
68 **Diaphragm valves.** Grinnell.
376 **Diverter valve.** Superior Separator.
29 **Flow control systems, automated.** Ladish.
78 **Impulse steam traps.** Yarnall-Waring.
404 **Nylon pressure tubing.** Garlock.
65 **Plastic Tubing.** U.S. Stoneware.
217 **Sanitary fittings/valves.** Cherry-Burrell.
118 **Spray nozzles.** Spraying systems.
216 **Stainless ball valve.** Lunkenheimer.
20 **Thermo-dynamic steam traps.** Sarco.

Plant Services

254 **Dispersives.** Hagan.
229 **Electronic water sterilizer.** Water Processing.
257 **Furnace fume control.** Pangborn.
64 **Gas generation.** Gas Atmospheres.
258 **Hydrocarbon distillates.** Sonneborn Chemical.
253 **Industrial gloves.** Wilson Rubber.
261 **Natural smoke solution.** B. Heller.
413 **Nitrogen gas generator.** General Electric.
112 **Steel tanks.** Filpaco.

Plant Site

22 **Plant locations.** Toledo Edison.

Power & Steam Equipment

213 **Small engine/generators.** Onan.
372 **Steam generator.** Malsbury Mfg.

Power Transmission Equipment

10 **Dry fluid drive.** Dodge Mfg.
212 **Speed changer.** Allis Chalmers.

Processing Equipment

246 **Aluminum pans, rigid foil.** Kaiser Aluminum.
374 **Continuous bread-dough systems.** Baker Perkins.
381 **Continuous dough maker.** Baker Process.
225 **Continuous food fryer.** Jabez Burns.
369 **Electric band oven.** Werner.
26 **Infrared process.** Fostoria.
411 **Margarine pasteurizer.** Gebr. Stork.
84 **Processing equipment.** Sprout Waldron.
407 **Starch cooker.** Corn Products.
1 **Sterilizer, automatic.** Gebr. Stork.
418 **Stirrer/heater.** Scientific Products.

Pumps & Air Compressors

32 **Food pumps.** Robbins & Myers.
211 **High vacuum booster pumps.** Roots-Connersville.
360 **Sanitary pump.** Waukesha Foundry.
115 **Stainless Steel pumps.** Viking Pump.

Separation Equipment

401 **Centrifuge.** De Laval Separator.
343 **Low temperature rendering system.** Sharples.
227 **Magnetic filtration.** Eriez Mfg.
4 **Starch processing equipment, high capacity.** Door-Oliver.
147 **Strainers.** Sarco.
226 **Water filters.** Hagan Chemicals.

Shipping Containers

117 **Centrifugally-lined pails.** Rheem.
247 **Cord strapping.** American Viscose.

Transportation

103 **Trucks.** Mack Trucks.

CIRCLE KEY NUMBERS ON OTHER SIDE OF CARD. WRITE NAME, ADDRESS—AND MAIL!

FIRST CLASS
PERMIT NO. 23708
PHILA. 39, PA.

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in U. S.

POSTAGE WILL BE PAID BY
FOOD Engineering

The Computer Center
P.O. Box 1970, Camden 1, N. J.

When all is said and done...

...NOTHING

TASTES SO TRUE

TO NATURE

Norda®

Flavor it with a favorite

Exclusive Basic Materials for: Candy and Chewing Gum, Dairy Products (Ice Cream and Cheese), Soft Drinks, Desserts (Puddings and Gelatins), Meat Products, Syrups, Bakery Products (Cake Mixes, Crackers, Snack Items), Pharmaceutical Products, Liquors and Cordials.

Write on your letterhead for free samples.

NORDA, 601 W. 26 St., New York 1, N.Y. • Chicago • Los Angeles • San Francisco • Toronto • Montreal • Havana • London • Paris • Grasse • Mexico City

CIRCLE 133 ON INQUIRY CARD

CIRCLE 134 ON INQUIRY CARD →

AN INSIDE LOOK AT FLAVORS THAT SELL

Look closely at any successful flavored product—nutritional supplements for weight control, cereals, beverages or one of many foods consumed daily. Taste it . . . compare it. Why is it some flavors have compelling consumer appeal?

IFF flavors sell and resell for two important reasons. They are exclusively designed for your product, your markets—and they are the finest flavors available. *IFF* flavors have created new product lines, improved established ones and stimulated brand-building sales the world over.

To manufacturers interested in selling abroad, *IFF* can supply your flavor—uniform in taste—from any of its plants throughout the Free World.

For an inside look at flavors designed to sell your products, contact *IFF*.

if

FLAVOR DIVISION
INTERNATIONAL FLAVORS & FRAGRANCES INC.
417 Rosehill Place, Elizabeth 2, N. J.
Leading Creators and Manufacturers in the World of Flavor